

Attachment D



UNIVERSITY OF
PENNSYLVANIA
HEALTH SYSTEM

PENNSYLVANIA
HOSPITAL

PDH
WCS
Department of Neurosurgery
William C. Welch, MD, FACS, FICS
Chief

April 15, 2008

Paul D. Kovac
Assistant U.S. Attorney
Western District Pennsylvania
U.S. Post Office & Courthouse
700 Grant Street, Suite 400
Pittsburgh, PA 15219

Dear Mr. Kovac:

Thank you for allowing me to review the Cooleen matter. In conducting my review, I examined the following medical documents and records of Mr. Cooleen that are dated April 2001 through January 2005:

1. Treatment Notes
2. Lab Reports
3. Radiology Reports
4. MRI Film – August 2002
5. MRI Film – May 2003
6. Medical History Reports
7. Civilian Medical Records (Hamot Medical Center)
8. Various BOP “Inmate Requests to Staff”

I understand that Mr. Cooleen is a middle-aged man who was formerly incarcerated in the federal prison system from approximately April 2001 through August 2005. Prior to his incarceration, the medical documents indicate that he underwent a right L5-S1 discectomy at Buffalo General Hospital for sciatica. He was initially incarcerated and examined by prison medical staff on April 16, 2001.

He injured himself on March 21, 2002 and filed an accident report on March 25, 2002. He was placed on “sick call” through April 1, 2002. He was examined repeatedly by medical personnel over the following months. The pain he was experiencing in April 2002 was left leg pain and right hip pain. The left leg pain was, by its description, consistent with sciatica. He was diagnosed as having a lumbar strain and sciatica. Medical examination in April 2002 demonstrated normal strength and a positive straight leg raise test on the left (consistent with nerve root irritation). The patient declined non-steroidal anti-inflammatory medicines. In May, 2002 he was told that he had a probable mild disc rupture and that healing of the disc would take

6-8 weeks. He was treated with various medications. In July 2002, he was seen by an orthopaedic surgeon and injections were recommended.

An MRI was obtained August 12, 2002. That study demonstrated a moderate left L4-5 disc rupture. By late September 2002, he was felt to be symptomatically improved by Dr. Bean. On March 27, 2003, the patient was seen by Dr. Gilman of neurosurgery. Dr. Gilman recommended surgical discectomy for the left L4-5 disc rupture. This was scheduled for May 13, 2003. The patient was admitted for the surgery and underwent a repeat MRI scan. That study demonstrated that the previously-seen disc rupture resorbed. Surgery was cancelled.

Mr. Cooleen's complaint alleges that his symptoms and findings of the lumbar disc rupture were not adequately or appropriately addressed. In my professional medical experience, I would state that most patients with Mr. Cooleen's medical complaints receive less medical attention and intervention than Mr. Cooleen received while incarcerated. Specifically, most patients with sciatica due to a disc rupture do not require surgery and are treated with modalities such as bed rest and anti-inflammatories. Mr. Cooleen was seen on multiple occasions by health care workers (including orthopaedic and neurological surgery specialists), underwent two MRI scans, received multiple medications and had reduced activities over the course of 14 months. He has residual neurological symptoms as a result of the left L4-5 disc rupture causing nerve dysfunction. There could be no guarantee that surgery, even if performed early in the patient's course, would have prevented these residual symptoms. As further evidence of this, it is notable that despite surgical intervention in 1999 for the L5-S1 disc rupture, he has residual neurological symptoms.

In summary, in my professional medical opinion, stated within a reasonable degree of medical certainty, Mr. Cooleen received more than appropriate and acceptable medical care. His treatment exceeded the reasonable standard of care for the evaluation and treatment of sciatica.

Sincerely,



William C. Welch, M.D., F.A.C.S., F.I.C.S
Chief, Pennsylvania Hospital
Professor of Neurosurgery, University of Pennsylvania School of Medicine



U.S. Department of Justice

United States Attorney
Western District of Pennsylvania

U.S. Post Office & Courthouse
700 Grant Street
Suite 4000
Pittsburgh, Pennsylvania 15219

February 6, 2008

412/644-3500

VIA FEDERAL EXPRESS

Dr. William Welch

██████████ Road

PA ██████████

(215) ██████████

COPY

RE: Expert Assistance - Cooleen v. LaManna, et al., Civil Action No. 04-63E

Dear Dr. Welch:

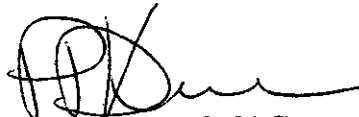
Thank you for agreeing to provide your expert assistance in this case. Your services and fees have been approved for payment by our office.

This case involves a former federal prison inmate, Mr. Timothy Cooleen, who injured his back while moving furniture during his prison work assignment at FCI McKean. I am defending the decisions made by the prison doctors to pursue a conservative course of treatment of the back injury without surgical intervention.

The enclosed documentation contains an MRI film (dtd. Aug. 21, 2002) showing a herniated disk. An outside consultant recommended possible surgery; however, prison doctors chose to pursue a more conservative course of treatment. By Spring 2003, Mr. Cooleen's pain became unbearable (according to him, pain was radiating down both legs). He was finally taken to the operating table in May 2003; however, a pre-op MRI indicated that the bulging disk had relieved itself and surgery was never performed. Our theory is that the conservative course of treatment was proper and did not display any indifference to Mr. Cooleen's medical needs. Mr. Cooleen contends that the delay in surgery caused him undue pain and permanent damage.

We would like your opinion whether the conservative course of treatment was proper in this case. Although the medical records contain other treatment unrelated to the back, your focus should be on the time period March 21, 2002 (date of back injury) through September 11, 2003 (his transfer to another facility).

If possible, we would like your review and a brief expert report of your opinions to be completed by April 4, 2008. For your convenience, we have numbered the medical records on the bottom center of each page. Please call me at (412) 894-7489 should you have any questions. We appreciate your help!


PAUL D. KOVAC
Assistant U.S. Attorney

UNIVERSITY OF PENNSYLVANIA - SCHOOL OF MEDICINE
Curriculum Vitae

Date: March 1, 2008

William C. Welch, MD, FACS, FICS

Office Address: Dept. of Neurosurgical Surgery
 Clinical Practices of the University of Pennsylvania, Inc.
 Pennsylvania Hospital
 Pennsylvania Neurological Institute
 330 South 9th Street, Fourth floor
 Philadelphia, PA 19107

Education:

1979-83	B.S.	The City College of New York (6-year BS-MD program)
1983-85	M.D.	State University of New York, Downstate Medical Center

Postgraduate Training and Fellowship Appointments:

1985-86	Internship, General Surgery, University of Rochester-Strong Memorial Hospital, Rochester, N.Y.
1986-91	Resident, Neurological Surgery, University of Rochester-Strong Memorial Hospital, Rochester, N.Y.
1991-92	Fellowship, Neuro-oncology, Albert Einstein College of Medicine, Montefiore Medical Center, Bronx, N.Y.
1992-93	Fellowship, Spinal Surgery, Albert Einstein College of Medicine, Weiler Hospital, Bronx, N.Y.

Military Service:

1989-1993	Lieutenant Commander, United States Naval Reserve, Honorably Discharged
-----------	---

Faculty Appointments:

1992-1993	Assistant Professor, Department of Neurosurgery Albert Einstein College of Medicine
1993-1999	Assistant Professor, Neurological Surgery University of Pittsburgh School of Medicine
1993-1999	Assistant Professor, Orthopaedic Surgery (secondary appt.) University of Pittsburgh School of Medicine
1996-1999	Assistant Professor, Rehabilitation Science and Technology University of Pittsburgh School of Health and Rehabilitation Sciences
1999-2004	Associate Professor, Neurological and Orthopaedic Surgery University of Pittsburgh School of Medicine
2000-2005	Associate Professor, Rehabilitation Science and Technology University of Pittsburgh School of Health and Rehabilitation Sciences (secondary appointment)
2001-2007	Conferral of Tenure, University of Pittsburgh School of Medicine
2004-2007	Professor, Neurological and Orthopaedic Surgery University of Pittsburgh School Medicine (secondary appt.)
2005-2007	Professor, Rehabilitation Science and Technology University of Pittsburgh School of Health and Rehabilitation Sciences
2005-2007	Peter E. Sheptak Professorship (Endowed Chair), Neurological Surgery, University of Pittsburgh School of Medicine
2005-	Visiting Adjunct Staff, Medical College Council, Cairo University, Cairo, Egypt

2007- Professor, Neurological Surgery (tenured), University of Pennsylvania School of Medicine

Hospital and Administrative Appointments:

1995-2007 Director of Spine Services, Department of Neurological Surgery, University of Pittsburgh School of Medicine and University of Pittsburgh Physicians

1999-2004 Blood Usage Review Committee 1999-2004

2000-2007 Utilization Review Committee, Presbyterian Hospital, Pittsburgh, Pennsylvania

2002-2007 Chief of Neurological Surgery, Department of Neurological Surgery, University of Pittsburgh School of Medicine, Presbyterian Hospital

2002-2007 Credentials Committee, University of Pittsburgh School of Medicine

2003-2007 Professional Healthcare Providers Review Committee (HRC), Presbyterian Hospital, Pittsburgh, Pennsylvania

2003-2007 Clinical Operations Committee, Presbyterian Hospital, Pittsburgh, Pennsylvania

2003-2007 OR Issues Committee, Presbyterian Hospital, Pittsburgh, Pennsylvania

2003-007 Task Force on Utilization of Surgical Implants, Presbyterian Hospital, Pittsburgh, Pennsylvania

2005-2007 Medical Executive Committee, University of Pittsburgh School of Medicine, Presbyterian Hospital, Pittsburgh, Pennsylvania

2005-2007 Operating Room Infection Control Committee, Presbyterian Hospital, Pittsburgh, Pennsylvania

2005-2007 Medical Director of the Surgical Services Oversight Committee, Presbyterian Hospital, Pittsburgh, Pennsylvania

2005-2007 Joint Surgical Services Oversight Committee Chairman, Presbyterian Hospital, Pittsburgh, Pennsylvania

2006-2007 Vice-President, Medical Staff, Surgical Based, University of Pittsburgh, Presbyterian Hospital, Pittsburgh, Pennsylvania

2007- Chief of Neurological Surgery, Department of Neurological Surgery, University of Pennsylvania School of Medicine, The Pennsylvania Hospital

2007- Member, Spine Committee, Pennsylvania Hospital

Other Appointments

1991-1992 Assistant Attending in Neurosurgery, Montefiore Medical Center, N.Y.

1992-1993 Attending in Neurosurgery, Holy Name Hospital, N.J.

1992-1993 Attending in Neurosurgery, Pascack Valley Hospital, N.J.

1992-1993 Attending in Neurosurgery, Acting Chief, Neurosurgical Research and Neuro-Oncology Service Section, Hackensack University Hospital, N.J.

1992-1993 Deputy Director of Neurosurgery
Bronx Municipal Hospital Corporation, N.Y.

1993-2007 Neurological Surgeon, Presbyterian University Hospital, Pittsburgh, PA

1994-2004 Neurological Surgeon, Veterans Affairs Medical Center, Oakland Division

1994-1995 Member, Spine Specialty Center University of Pittsburgh Medical Center-Health System

1995-2007 Member, Center for Clinical Neurophysiology University of Pittsburgh Medical Center-Health System, Pittsburgh, PA

1995-2001 Co-Director, Spine Specialty Center, University of Pittsburgh Medical Center-Health System

1997-1999 Neurological Surgeon of Pittsburgh Medical Center-Health System, Beaver Medical Campus

1998-2007 Surgery: Pediatric Neurosurgery (Affiliate)

	Children's Hospital of Pittsburgh
1998-2007	Neurological Surgeon (Courtesy Privileges) of Pittsburgh Medical Center-Health System-Shadyside Hospital
1998-2007	Institutional Review Board Pre-Submission Committee of Pittsburgh Medical Center- Health System
1999-2007	Neurological Surgeon, Nassar Institute Cairo, Egypt
1995-2007	Executive Planning Committee, Department of Neurological Surgery, of Pittsburgh Medical Center-Health System
1996-2002	Ad Hoc Reviewer for Copeland Grant, Department of Neurological Surgery, of Pittsburgh Medical Center-Health System
2000-2007	Post Graduate Medical Education Committee, Department of Neurological Surgery, of Pittsburgh Medical Center-Health System
2000-2007	Patient Satisfaction Committee, Department of Neurological Surgery, of Pittsburgh Medical Center-Health System
2001-2007	Patient Care Committee, Presbyterian Hospital, Department of Neurological Surgery, of Pittsburgh Medical Center-Health System
1999-2004	Neurological Surgeon (Courtesy Privileges) University of Pittsburgh Medical Center, Horizon Hospital
2005-	Executive Council, Pennsylvania Neurosurgical Society Board
2005-2007	Co-Director of the Welch Biomechanical Neurosurgical Research Laboratory, Department of Neurological Surgery, University of Pittsburgh School of Medicine Department of Neurological Surgery
2004-	Consultant, Queen of Qatar
2004-2007	Attending/Active Staff in Neurosurgery Select Specialty Hospital-Pittsburgh/University of Pittsburgh Medical Center
2002-	Consultant, Wuxi No. 3 People's Hospital of Nantong Medical College, Wuxi, Shanghai, Peoples Republic of China
2002	Neurologic Surgeon, Alexandria Spine Institute, Alexandria, Egypt
2001-2003	Director, Spine Specialty Center, University of Pittsburgh Medical Center
2000-2003	Associate Director, Surgical Training and Technologies (STAT) Center, University of Pittsburgh Medical Center
2000-2007	Executive Steering Committee, Department of Neurological Surgery, University of Pittsburgh Medical Center
2000-2007	Member, Cranial Base Center University of Pittsburgh Medical Center
2007-	Operating Room Committee, Pennsylvania Hospital, Philadelphia, PA
2007-	Executive Committee, Pennsylvania Hospital, Philadelphia, PA
2008-	Neurosurgical Consultant to the Philadelphia Flyers Hockey Team

Specialty Certification:

1995	American Board of Neurological Surgeons
------	---

Licensure:

1992-	Pennsylvania State Medical License
1992-2004	New Jersey State Medical License
2006-	New Jersey State Medical License
1987-2004	New York State Medical License
2006-	New York State Medical License

Awards, Honors and Membership in Honorary Societies:

1983	Dean's List at the City College of New York
1983	Magna Cum Laude at Sophie Davis School of Biomedical Education
1984 -	Alpha Omega Alpha
1985	Cum Laude at State University of New York, Downstate School of Medicine
1991 -	Who's Who in the World
1995 -	Who's Who in America
1996	Faculty Teaching Award, Department of Neurosurgery, University of Pittsburgh
1998	Outstanding Young American
2001	National Registry of Who's Who
2001	CNS First Place Poster Award
2001-2006	Best Doctors in America
2002-2003	The Sanford Larson and Volker Sonntag Award (co-investigator)
2002	Lifetime Honored Member Strathmore's Who's Who
2002-2003	Congress of Neurological Surgery Wilder Penfield Investigator Award (mentor)
2003-2004	The Sanford Larson and Volker Sonntag Award (co-investigator)
2003-	Who's Who in Finance and Industry
2003-	Who's Who in Science and Engineering
2004	International Health Professional of the Year
2004	UPMC's Physician ACES award
2006-	America's Top Surgeons

Memberships in Professional and Scientific Societies: (Include offices held.)

International:

International College of Surgeons (2000-)
 AMA Advisory Task Force Committee 2001
 Scholarship and Research Committee 2004, 2005

National:

American Association for Cancer Research (1996-2006)
 American Association of Neurologic Surgeons (1990-)
 Sergeant-At-Arms 1997, 2000
 Ambassador 1997-1998
 Spine Outcomes Research Committee (1998-1999)
 Communications/Public Relations Committee (1999)
 Guidelines Committee (1998-2000)
 American Association of Neurologic Surgeons
 Joint Section on Disorders of the Spine and Peripheral Nerves (1992-)
 Joint Section on Neurotrauma and Critical Care (1998-)
 Executive Committee (Educational Section) (2003-)
 Joint Section on Tumor (1998-)
 American College of Managed Care Medicine (1998-2000)
 American College of Surgeons (1997-)
 Admissions Committee (2005-2006)
 American Medical Association (1985-)
 Allegheny County Medical Society (1993-)
 Alternate Delegate (2001-2005)
 Cervical Spine Research Society (2004-)
 Congress of Neurological Surgeons (1996-)
 Registration Committee (1998)
 Co-Chairman, Sergeant-at-Arms Committee (2002)

Devices Forum (2004-2006)
Scientific Review Committee (2005-2007)
Council of Advisors (2001-)
Neurosurgical Society of America (2001-)
New York Academy of Sciences (1985-)
North American Spine Society
Food and Drug Administration Consultant (1999-2000)
Research Project Management Committee (2000-2006)
Research Foundation Volunteer (2002)
Outcomes Compendium Task Force (2003-2006)
North American Skull Base Society (2000-2003)
Research Society of Neurological Surgeons (1995-1998)
Society for In Vitro Biology (1995-2004)
Society of Neurological Surgeons (Senior Society) (2006-)
Society for Regenerative Medicine (2000-2003)
Spine Trauma Study Group (2003-2005)
South Carolina Spine Society (Honorary Member, 2004)

Local:

Pennsylvania Medical Society (1993-)
Pennsylvania Neurosurgical Society (2000-)
Executive Council Member-at-Large (2006-2008)

Editorial Positions:

1. Associate Editor for *Spine*
2. Associate Editor, *Spinal Arthroplasty Society Journal*
3. Ad hoc reviewer for *Physical Therapy*
4. Ad hoc reviewer for *Journal of Neuro-Oncology*
5. Ad hoc reviewer for *Cancer Detection and Prevention*
6. Ad hoc reviewer for *Neurology*
7. Ad hoc reviewer for *Surgical Neurology*
8. Ad hoc reviewer for *Spinal Cord*
9. Ad hoc reviewer for *Technology in Cancer Research and Treatment*

Academic and Institutional Committees:

1. Technology Transfer Committee-Ad Hoc Reviewer, University of Pittsburgh 1999-2007
2. University of Pittsburgh School of Medicine Executive Committee Standing Committee for Non-Tenured Faculty Promotions and Appointments (NTFPA) 2004-2007.

Major Academic and Clinical Teaching Responsibilities:

1. Teach medical students, residents, fellows and visiting surgeons basic biomechanical science laboratory procedures in the Welch Biomechanical Neurosurgical Research Laboratory.
2. Minority summer medical student training in basic science laboratory research project (winner of American Brain Tumor Association basic science research grant 1995-1996).
3. Train neurosurgical residents in operative techniques, pre-operative evaluation and post-operative management of patients.
4. Student teachings:
 - A. Emily Lehmann 2003 Medical Student Summer Research Program (Gerszten PC, PI)
 - B. Ryan Faught, 2006-2007, Carnegie Mellon University

5. Neurological Surgery Spinal Fellowship Program:

- A. Patrick Flannagan, MD: July-December 1998, Laboratory Fellowship, Allegheny University, Pittsburgh, Pennsylvania, senior neurosurgical resident, currently in University-Affiliated practice, Allegheny University of Health Sciences, Department of Neurosurgery.
- B. Kevin Mullins, MD: September 21-October 31, 1998, Clinical Neurosurgical Fellowship, Graduate of the University of Rochester, Rochester NY, 1997, currently in private practice.
- C. Peter C. Gerszten, MD, MPH: July 1, 1999-June 30, 2000, Clinical and Research Fellowship, Graduate of the University of Pittsburgh, Pittsburgh, Pennsylvania, 1999, currently Assistant Professor, Department of Neurological Surgery, University of Pittsburgh/UPMC-HS.
- D. John B. Wahlig, MD: July 1999-June 2000, Clinical and Research Fellowship, senior resident of the University of Pittsburgh, Pittsburgh, Pennsylvania, 2001, currently in private practice.
- E. Angel Vega Curiel, MD: October 1999-December 1999, Research Fellowship, currently staff orthopaedic spine surgeon at the Hospital La Fe de Valencia, Spain.
- F. James P. Burke, MD, PhD: July 2000-June 2001, Clinical and Research Fellowship, currently in private practice.
- G. Jonathan D. Sherman, MD: July 2001-June 2002, Clinical and Research Fellowship, graduate of the University of Cincinnati, Cincinnati, Ohio, 2001, currently in private practice.
- H. Masaki Oishi, MD, PhD: July 2002-June 2003, Clinical and Research Fellowship, Graduate of the Albert Einstein College of Medicine, Montefiore University Hospital, Bronx, New York, 2002, winner of the Congress of Neurologic Surgeons Wilder Penfield Investigation Award 2002-2003, currently in private practice.
- I. Ira Goldstein, M.D: July 2003-June 2004, Clinical and Research Fellowship, Graduate of the Albert Einstein College of Medicine, Montefiore University Hospital, Bronx, New York, 2003, currently Assistant Professor of Neurosurgery UMDNJ.
- J. Richard M. Spiro, M.D.: July 1, 2004-December 31, 2004, Clinical Fellowship, Graduate of the University of Pittsburgh, Pittsburgh, Pennsylvania, 2004, currently Assistant Professor, Department of Neurological Surgery, University of Pittsburgh/UPMC-HS.
- K. Michael Sharts, M.D.: July 1 2005-June 30, 2006, Research Fellowship, currently chief resident in Neurological Surgery at the University of Pittsburgh.
- L. Chung Kee Chough, M.D.: September 1, 2005 to August 31, 2006, Research Fellowship, Assistant Professor of Neurological Surgery at The Catholic University of Korea, St. Mary's Hospital, Seoul, Korea.
- M. Tariq Eleman El Shafey Awad, M.D.: January 1, 2006-December 30, 2006, Research Fellowship, Assistant Professor of Neurological Surgery, Suez Canal University, Suez Canal, Egypt.
- N. Ashok Gupta, M.D.: June 1, 2007-September 30, 2007, Research Fellowship (Winner of the Congress of Neurological Surgeons International Fellowship Award), currently Assistant Professor, Government Hospital, Kota, India.
- O. Steven Pirris, M.D.: July 1, 2006-June 30, 2007, Research Fellowship, currently senior resident in Neurological Surgery at the University of Pittsburgh.
- P. Ali Abou Madawi, M.D.: April 16-27, 2007, Visiting International Scholar, currently Assistant Professor, Suez Canal University Hospital (SCUH), Suez Canal District, Egypt.

6. Oversee Educational Forum at local, regional, national and international levels.
7. Participate in Department of Orthopaedic Surgery spinal surgery fellowship training program (Department of Orthopaedic Surgery, University of Pittsburgh, 1993-2007).
8. Participate in the Department of Rehabilitation spinal fellowship training program (Department of Orthopaedic Surgery, University of Pittsburgh, 1993-2007).

Lectures by Invitation: (List only the past 5 years)

Sept. 11, 2002	Welch, WC , Sherman JD, Gerszten PC, Nestler A. "Cervical Pseudarthrosis: Surgical Management." Oral presentation at the 11th Annual Summer Meeting of the Egyptian Society of Neurosurgeons, Alexandria Egypt.
Sept. 11, 2002	Welch, WC , Sherman JD, Gerszten PC, Nestler A. "POLAr Technique: Indications and Outcome Results." Oral presentation at the 11th Annual Summer Meeting of the Egyptian Society of Neurosurgeons, Alexandria Egypt.
September 19, 2002	Welch WC . "Spinal Cord Trauma." Presented at Surgical Grand Rounds, Robert Packer Hospital/Guthrie Clinic, Sayre, Pennsylvania.
September 24, 2002	Welch WC . "Biomechanics and Non-Surgical Management of Odontoid Fractures." Presented at the Luncheon Seminar presentation at the 52nd Annual Meeting of the Congress of Neurological Surgeons Annual Meeting, Philadelphia, Pennsylvania.
October 12, 2002	Gerszten PC, Burton SA, Ozhasoglu C, Welch WC , Kalnicki S. "Spinal Stereotactic Radiosurgery Using a Frameless System and Real-time Image Guidance." Oral presentation at the XVth European Society for Stereotactic and Functional Neurosurgery, Toulouse, France.
November 23, 2002	Welch WC . "Kyphoplasty: Indications and Technique." Oral presentation at the Wuxi/Shanghai Spine Conference, Wuxi, Jiangsu Province, Peoples Republic of China.
November 23, 2002	Welch WC . "POLAr Interbody Fusion Procedure: Indications and Technique." Oral presentation at the Wuxi/Shanghai Spine Conference, Wuxi, Jiangsu Province, Peoples Republic of China.
February 7, 2003	Welch WC . "Spinal Cord Injury-An Overview." Presented at Nursing Grand Rounds, Presbyterian University Hospital, Pittsburgh, Pennsylvania.
February 12, 2003	Welch WC , Jungreis C. "Myelopathy due to Spinal Cord AVM." Presented at the Clinical Combined Neuroscience Conference, Departments of Neurology and Neurosurgery, Continuing Medical Education Course sponsored by the Center for Continuing Education, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania.
February 12, 2003	Welch WC . "Spinal Metastases-A Surgical Approach," Cyberknife Center of Excellence Course, sponsored by Accuray corporation, Shadyside Hospital, UPMC-Health System, Pittsburgh, Pennsylvania.
February 12, 2003	Welch WC , Balzer J, Tyler-Kabara E, Gerszten PC, Sclabassi R. "Intraoperative Monitoring During Interbody Fusion." Oral presentation at the 2003 Winter Neuroscience Symposium, Snowmass Conference Center, Snowmass Village, Colorado.
February 23, 2003	Kuntz C, Welch WC . "Consultant's Corner: Clinical Decisions Regarding Thoraco-Lumbar Spine Pathology-Hands-On Course." 2003 Winter Neuroscience Symposium, Snowmass Conference Center, Snowmass Village, Colorado.
February 23, 2003	Welch WC , Kassam AB, Carrau R, Gerszten PC, Snyderman C. "Surgical Management of Occipital-Cervical Instability." Oral presentation at the 2003

- Winter Neuroscience Symposium, Snowmass Conference Center, Snowmass Village, Colorado.
- April 5, 2003 **Welch WC.** "Selection of Surgical Approach-Anterior vs. Posterior," Challenges to Spine Surgery, EBI Corporation, Venetian Hotel Resort and Casino, Las Vegas, Nevada.
- April 11, 2003 **Welch WC.** "The Dynesys® Spinal System Clinical IDE Surgeon Program, Program Objectives and Introductions, Dynesys® Overview, US Clinical IDE Study Review, and Cadaver Practical Laboratory" University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania.
- April 23, 2003 **Welch WC, Gerszten PC, Sherman J, Macenski M.** "POLAr Procedure." Presented at the Neurological Surgery Conference, Continuing Medical Education Course sponsored by the Center for Continuing Education, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania.
- May 19, 2003 **Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, Atkins BA, Welch WC, Kalnicki S.** "Evaluation of the CyberKnife Frameless Real-Time Image-Guided Stereotactic Radiosurgery for Spinal Lesions: a series of 70 Patients." Quadrennial Meeting of the American Society for Stereotactic and Functional Neurosurgery. New York.
- September 19, 2003 **Welch WC, Gerszten PC.** "Cervical Pseudarthrosis-Diagnosis and Management." Presented at the EBI Medical Systems Spine Surgery Forum, New Orleans, Louisiana.
- September 19, 2003 **Welch WC, Gerszten PC.** "Safety and Efficacy of Direct Current Bone Stimulator Use as a Surgical Adjunct in the Para-Axial Region." Presented at the EBI Medical Systems Spine Surgery Forum, New Orleans, Louisiana.
- September 25, 2003 **Welch WC, Gerszten PC, Oishi M:** "Evaluation of the POLAr (Posterior Oblique Lumbar Arthrodesis) Lumbar Fusion Technique." Oral presentation at the Tominaga Hospital, Osaka, Japan.
- September 25, 2003 **Welch WC, Gerszten PC, Oishi M:** "BAK-C Constructs: Technique and Outcome Evaluation for Cervical Fusion." Oral presentation at the Tominaga Hospital, Osaka, Japan.
- September 26, 2003 **Welch WC, Gerszten PC, Oishi M:** "Evaluation of the POLAr (Posterior Oblique Lumbar Arthrodesis) Lumbar Fusion Technique." Oral presentation at the 10th Annual Meeting of the Japan Society for the Study of Surgical Technique for Spine and Spinal Nerves, Toshi Center, Hirakawa-cho, Chiyoda-ku, Tokyo, Japan.
- October 1, 2003. **Welch WC, Gerszten PC, Cornwall GB.** "Early Clinical Experience with a Novel Resorbable Adhesion Barrier Film." Eurospine Annual Meeting, Prague, Czech Republic.
- November 5, 2003 **Welch WC, Gerszten PC, Nestler A.** "Revision Strategies for Cervical Pseudarthrosis." Presented at the Combined Neuroscience Conference, University of Pittsburgh School of Medicine, Center for Continuing Medical Education, Pittsburgh, Pennsylvania.
- November 15, 2003 **Welch WC, Cornwall B, Oishi M.** "Bioresorbables in Neurosurgery." Presented at the Pennsylvania Neurosurgical Society Annual Fall Scientific Meeting, Drexelbrook Meeting Center, Philadelphia, Pennsylvania.
- November 19, 2003 **Welch WC.** "Lumbar Spinal Fusion: A Surgeon's Perspective." Presented at the Department of Physical Medicine and Rehabilitation Grand Rounds, University of Pittsburgh School of Medicine.
- January 20, 2004 **Welch WC, Schwarzenbach O.** "Dynesys: Dynamic Neutralization for the Lumbar Spine." Oral presentation at the 16th Annual Contemporary Update on Disorders of the Spine, University of South Florida College of Medicine and University of Florida, Whistler, British Columbia, Canada.

January 27, 2004	Welch WC, Moderator for Mini-Symposium 3. "Treatment Options for Lumbar Instability." Presented at the Fourth Annual Pittsburgh Spine Symposium, Pittsburgh, Pennsylvania.
February 28, 2004	Welch WC. "Patient Epidemiology, Examination and Complication Avoidance," Management of the Critical Care Patient Senior Residents Course, sponsored by Synthes Corp., Pittsburgh, Pennsylvania.
March 26, 2004	Welch WC. "Healos in ALIF," DePuy-Spine, Medical University of South Carolina, Charleston, South Carolina.
April 23, 2004	Welch WC, Gerszten PC. "Safety and Efficacy of Direct Current Bone Stimulator Use as a Surgical Adjunct in the Para-Axial Region." Presented at the EBI Medical Systems Spine Surgery Forum, Las Vegas, Nevada.
April 30, 2004	Welch WC, Gerszten PC. "Cervical Threaded Cages." Oral presentation at the Cervical Spine Update 2004-Advanced Surgical Techniques, New England Baptist Hospital, Boston, Massachusetts.
May 1, 2004	Welch WC. "Cervical Laminotomy-Minimally Invasive Approaches." Oral presentation at the Cervical Spine Update 2004-Advanced Surgical Techniques, New England Baptist Hospital, Boston, Massachusetts.
May 2, 2004	Welch WC. "Endoscopically-Assisted, Image-Guided Transoral Odontoid Resection," presented at the 72 nd Annual Meeting of the American Association of Neurologic Surgeons, for the Indications, Limitations, and Complications of Transoral approaches to the Spine (Course 026), Orlando, Florida.
July 16, 2004	Gerszten PC, Welch WC , Burton SA, Ozhasoglu C. "CyberKnife Radiosurgery: A New Treatment Modality for Spinal Neoplasms." Platform Presentation at the Pennsylvania Neurosurgical Society Joint Annual Meeting, Hershey, Pennsylvania.
October 20, 2004	Welch WC. "Biomechanics of Bioresorbable Fixation Devices." Presented at the W36 Luncheon Seminar presentation at the 54th Annual Meeting of the Congress of Neurological Surgeons Annual Meeting, San Francisco, California.
October 23, 2004	Welch WC. "Dynesys: Dynamic Neutralization for the Lumbar Spine." Oral presentation at the South Carolina Spine Society Meeting, Charleston, South Carolina.
December 10, 2004	Gerszten PC, Welch WC , Burton S, Ozhasoglu C. "CyberKnife Frameless Stereotactic Radiosurgery for the Treatment of Tumors of the Cervical Spine." Oral presentation at the Annual Cervical Spine Research Society Meeting, Boston, MA.
January 8, 2005	Welch WC "The Dynesys® Spinal System Clinical IDE Surgeon Program Case Study, Practice Review, and Cadaver Practical Laboratory" Thomas Jefferson University, Philadelphia, Pennsylvania.
January 18, 2005	Welch WC, Osterberg J, Dawson J. "Alternative Posterior Motion Preserving Techniques." 17 th Annual Contemporary Update on Disorders of the Spine, University of South Florida College of Medicine and University of Florida, Whistler, British Columbia, Canada.
February 26, 2005	Welch WC. "Mechanistic and Radiographic Classification of Spinal Trauma" and "Surgical Management of Lumbar Fractures," Management of the Critical Care Patient Senior Residents Course, sponsored by Synthes Corp., Pittsburgh, Pennsylvania.
March 2, 2005	Welch WC, Gerszten PC, Cheng BC. "Lumbar Biomechanics: Non-Fusion Device." Oral presentation at the 2006 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado,
March 2, 2005	Welch WC, Osterberg J, Dawson JW. "Dynamic Neutralization of the Lumbar Spine." Oral presentation at the 2005 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado.

March 4, 2005	Welch WC , Ong J, Gerszten PC, Nestler AN, Burke JP. "Anterior Cervical Instrumentation Failure." Oral presentation at the 2005 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado.
March 4, 2005	Welch WC . "Fusion Adjuncts: Electrical Stimulation." Oral presentation at the 2005 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado, March 4, 2005.
March 12, 2005	Gerszten PC, Welch WC . "Alternatives to Arthroplasty and Arthrodesis of the Disc." Oral presentation at the Techniques Mini-Invasives et les Lesions du Disque Lominaire Conference, University of Brugmann, Brussels, Belgium.
April 1, 2005	Welch WC , Sharts M. "Science of Bone Biologics." Oral presentation at the Neurosurgery Residents Spine Education Summit, sponsored by DePuy Spine, Phoenix, Arizona.
April 19, 2005	Welch WC , Osterberg JC, Dawson J. "Other Methods of Motion Preservation." Oral presentation at Zimmer Spine dinner and discussion, New Orleans, Louisiana.
May 14, 2005	Welch WC . "Dynesys: Indications and Technique." Oral presentation at the 2nd Annual Wuxi/Shanghai Spine Conference, Wuxi, Jiangsu Province, Peoples Republic of China.
May 20, 2005	Welch WC . "Lumbar Spinal Surgery: Patient Selection and Operative Techniques." Presented at the UPMC Northwest's Annual Professor' Day Symposium, Greenville, Pennsylvania.
August 5, 2005	Welch WC . "The Dynesys® Spinal System Clinical IDE Surgeon Program," Program Objectives and Introductions, Dynesys® Overview, US Clinical IDE Study Review, and Cadaver Practical Laboratory" University of Pittsburgh Medical Center, Pittsburgh, PA.
September 11, 2005	Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, Quinn AE, Welch WC . Single fraction spinal radiosurgery for the treatment of spinal metastases. 7 th International Stereotactic Radiosurgery Society Congress. Brussels, Belgium.
September 21, 2005	Welch WC . "Methods of Lumbar Motion Preservation," West Virginia University, Department of Neurological Surgery, Morgantown, West Virginia.
December 21, 2005	Welch WC . "Motion Preservation Surgery for the Lumbar Spine." Presented at the Department of Neurology Grand Rounds, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania.
January 16, 2006	Welch WC . "Posterior Lumbar Motion Preservation Surgery." 18 th Annual Contemporary Update on Disorders of the Spine, University of South Florida College of Medicine and University of Florida, Whistler, British Columbia, Canada.
February 26, 2006	Welch WC , Gerszten PC, Cheng BC. "Dynesys Non-Fusion Stabilization Device." Oral presentation at the 2006 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado.
February 26, 2006	Welch WC , Gerszten PC, Cheng BC. "Lumbar Biomechanics: Non-Fusion Device." Oral presentation at the 2006 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado.
February 26, 2006	Welch WC , Alexander J. "Case Discussion: Motion Preservation Techniques." Discussion at the 2006 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado.
March 1, 2006	Welch WC . Co-Chairman, Faculty and Lecturer, "Mechanistic and Radiographic Classification of Spinal Trauma" and "Surgical Management of Lumbar Fractures," Management of the Critical Care Patient Senior Residents Course, sponsored by Synthes Corp., Pittsburgh, Pennsylvania.

March 30, 2006	Welch WC. "Lumbar Spinal Motion Preservation." Presented to the School of Rehabilitative Sciences and Technology, University of Pittsburgh, Pittsburgh, Pennsylvania.
April 22, 2006	Welch WC. "Image-Guided Spinal Navigation: Approach and Resection of Atlanto-Axial Tumors," PC 03 Image Guided Surgery and Radiosurgery of the Spine, San Francisco, California.
April 22, 2006	Welch WC. PC 011 Thoracic and Lumbar Stabilization and Fusion: "Indications and Complications," San Francisco, California.
May 5, 2006	Welch WC, Gerszten PC, Cheng BC. "Posterior Lumbar Motion Preservation." Oral presentation at the Temple University School of Medicine 2 nd Annual Spine Symposium, Philadelphia, Pennsylvania
May 18, 2006	Welch WC. "Innagural Peter E. Sheptak Professorship Lecture: Reconstructive Spinal Nerosurgery." Presented at the University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania.
June 21, 2006	Welch WC, Gerszten PC, Cheng BC. "Update on Lumbar Spinal Motion Preservation Techniques." Presented to the Department of Neurological Surgery, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania.
July 14, 2006	Cheng BC, Welch WC. "Biomechanics of Motion Preservation Devices." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, Pennsylvania.
July 14, 2006	Welch WC, Cheng BC, Gerszten PC. "Dynesys Spinal Instrumentation System." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, Pennsylvania.
July 14, 2006	Welch WC. "TTL Rod Technology." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, Pennsylvania.
July 19, 2006	Welch WC. "Radiologic and Mechanistic Classification of Spinal Fractures." Presented at the Department of Neurosurgery Grand Rounds, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania
August 8, 2006	Welch WC. "Dynesys Indications and Technique, Presentation and Practical Lab." Albany Medical Center, Albany, New York.
August 11, 2006	Welch WC, Cheng BC. "Cervical Spine Arthroplasty." Presented at the Emerging Technologies in Spine II Conference, Las Vegas, Nevada.
September 29, 2006	Delmarter RB, Maxwell J, Davis RJ, Sherman J, Welch WC. "Non-fusion Application of the Dynesys System in the Lumbar Spine: Early Results from the IDE Multicenter Trial." Oral presentation #151 at the 21th Annual Meeting of the North American Spine Society Meeting, Chicago, Illinois.
October 8, 2006	Welch WC, Cheng BC. "Emerging Technology-Posterior Lumbar Dynamic Stabilization." PC15 at the 55 th Annual Meeting of the Congress of Neurological Surgeons, Chicago, Illinois.
October 8, 2006	Davis RJ, Maxwell J, Delamarter R, Wingate J, Sherman J, Welch WC. "Dynamic Stabilization of the Lumbar Spine Using the Dynesys Spinal System: Early Results of the Multicenter Trial." Oral presentation #830 at the 55 th Annual Meeting of the Congress of Neurological Surgeons, Chicago, Illinois.
October 19, 2006	Welch WC, Scarrow A. "Legal Concerns Regarding the Formation of a Spine Center." Presented at the Spine Centers of Excellence Conference, Hotel Palomar, Washington D.C.
November 11, 2006.	Welch WC. Faculty and Lecturer, "Mechanistic, Radiographic Classification and Surgical Management of Thoraco-Lumbar Fractures," Management of the Critical Care Patient Senior Residents Course, sponsored by Synthes Corp., UCSF, San Francisco, California.
December 4, 2006	Welch WC, Cheng, BC. "Posterior Lumbar Motion Preservation Techniques." Presented at the University of Florida, Gainesville, Florida.

March 1, 2007 **Welch WC**, Cheng BC. "Failure of Anterior Cervical Fusion." Oral presentation at The Winter Clinics for Cranial and Spinal Surgery, Snowmass, Colorado.

March 7, 2007 **Welch WC**, Sherman J, Davis R, Maxwell J, Cheng BC, Wingate J, Delmarter, R. "Pedicle-Screw Based Dynamic Stabilization: Current Status and Outcomes." Oral presentation at the AANS/CNS Section on disorders of the Spine and Peripheral Nerves, Phoenix, Arizona.

March 21, 2007 **Welch WC**, Cheng BC. "Arthrodesis and Arthroplasty." Lecture to Carnegie Mellon University Biomedical Engineering students, Pittsburgh, Pennsylvania.

March 21, 2007 Cheng BC, **Welch WC**. "Clinically Relevant Biomechanics." Lecture to Carnegie Mellon University Biomedical Engineering students, Pittsburgh, Pennsylvania.

March 27, 2007 **Welch WC**. "Posterior Lumbar Motion Preservation Devices." Lecture to the Harvey Cushing Institutes of Neuroscience, North Shore LIJ Health System, Manhasset, New York.

March 29, 2007 **Welch WC**, Cheng, BC. "Lumbar Motion Preservation Techniques and Associated Biomechanics." Lecture to Department of Neurosurgery, Medical University of South Carolina, Charleston, South Carolina.

March 29, 2007 Cheng, BC, **Welch WC**. "Biomechanics of Cervical Discs." Preservation of Motion in the Spine Annual Conference, Duck Key, Florida.

March 30, 2007 Cheng, BC, **Welch WC**. "Industry Standards for Implant Testing." Preservation of Motion in the Spine Annual Conference, Duck Key, Florida.

March 31, 2007 Cheng, BC, Vanderby R, **Welch WC**. "Biomechanical Evaluation of Total disc Replacement (TDR)." Preservation of Motion in the Spine Annual Conference, Duck Key, Florida.

April 15, 2007 **Welch WC**. PC 031 Faculty, Thoracic and Lumbar Stabilization and Fusion: "Indications and Complications," Washington, D.C.

April 16, 2007 **Welch WC**. "A Career in Academics." Faculty, Life After Residency course, Stryker Spine Corporation, Grand Hyatt Hotel, Washington, D.C.

April 17, 2007 **Welch WC**. "Dynesys Spinal System: Update." Zimmer Spine. Renaissance Hotel, Washington, D.C.

March 7, 2007 **Welch WC**, Sherman J, Davis R, Maxwell J, Cheng BC, Wingate J, Delmarter, R. "Pedicle-Screw Based Dynamic Stabilization: Current Status and Outcomes." Oral presentation at the AANS/CNS Section on disorders of the Spine and Peripheral Nerves, Phoenix, Arizona.

June 1, 2007 **Welch WC**, Cheng BC. "Biomechanical Approach to C2 Fractures." University of Cairo Department of Neurological Surgery, Cairo, Egypt.

July 28, 2007 Lee J, Gerszten PC, **Welch WC**. "Cyberknife Radiosurgery for Spinal Emergencies." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, Pennsylvania. July 28, 2007

August 3, 2007 **Welch WC**, Cheng BC, Castellvi AE. "Adjacent Segment Disease: Fact or Fiction? Natural History or Iatrogenic? Significance?" Oral presentation at the Controversies and Considerations in the Surgical Treatment of the Aging Spine Conference, Stryker Corporation, Fort Lauderdale, Florida.

October 19, 2007 **Welch WC**. "Odontoid Fracture Diagnosis and Management." Oral presentation at the AANS Fundamentals in Spine Surgery for Residents meeting, Memphis, Tennessee

October 20, 2007 **Welch WC**. "Posterior Dynamic Stabilization Systems." Oral presentation at the AANS Fundamentals in Spine Surgery for Residents meeting, Memphis, Tennessee

February 25, 2008 **Welch WC**, Maxwell J, Wingate J, Sherman J, Cheng B, Delamarter R, Davis R. "2-Year Results from the FDA IDE Trial of Dynamic Neutralization of the Lumbar Spine." Oral presentation at the 2008 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado.

March 1, 2008 **Welch WC**, Maxwell J, Wingate J, Sherman J, Cheng B, Delamarter R, Davis R. "Posterior Dynamic Stabilization: 1-2 Year Follow-Up." Oral presentation at the 2008 AANS/CNS Sections on Disorders of the Spine and Peripheral Nerves, Orlando. Florida.

Organizing Roles in Scientific Meetings:

1997-1998	AANS Ambassador "Getting Smart About Neurosurgery," Lumbar Spinal Stenosis.
February 18-22, 1997	Sergeant at Arms AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, Rancho Mirage, California.
1998-1999	Spine Outcomes Research Committee, CNS/AANS.
1998-1999	Spine Section Guidelines Committee.
1998-2000	Joint Section on Disorders of the Spine and Peripheral Nerves Guidelines Committee.
August 28-29, 1998	Chairman, EBI Systems Inc. Neurosurgical Forum, Parsippany, New Jersey.
October 3-8, 1998	Registration Committee, Congress of Neurological Surgeons, Seattle, Washington.
1999	Communications/Public Relations Committee Congress of Neurological Surgeons.
1999-2000	Food and Drug Administration Consultant for Spinal Implants for North American Spinal Society.
March 27-29, 1999	Chairman, EBI Systems Inc. Neurosurgical Forum, Parsippany, New Jersey.
November 19, 1999	Chairman, EBI Systems Inc. Neurosurgical Forum, Parsippany, New Jersey.
2000-2006	Research Project Management Committee of the North American Spine Society (NASS)
2000-2003	Research Project Management Committee of the North American Spine Society (NASS)
April 12-14, 2000	AANS/CNS volunteer exhibitor for the American College of Physicians/American Society of Internal Medicine Scientific Assembly Meeting, Philadelphia, Pennsylvania.
June 2-3, 2000	Chairman, Sulzer Spine-Tech, "Silhouette Posterior Fixation System Workshop," Washington, District of Columbia, June.
August 17-19, 2000	Chairman, Sulzer Spine-Tech Center of Excellence Course, Pittsburgh, Pennsylvania.
September 9-10, 2000	Chairman, Sulzer Spine-Tech, "Silhouette Posterior Fixation System Workshop," Washington, District of Columbia.
	Sept. 23-28, 2000 Sergeant at Arms CNS Annual Meeting, San Antonio, Texas.
October 5-7, 2000	Chairman, Sulzer Spine-Tech Center of Excellence Course, Pittsburgh, Pennsylvania.
	2001-2005 Alternate Delegate, Allegheny County Medical Society
March 15-18, 2001	Chairman, EBI Systems Inc. Spine Forum, Parsippany, New Jersey.
June 8, 2001	Chairman, Sulzer Spine-Tech Center of Excellence Course, Pittsburgh, Pennsylvania.
July 2, 2001	Director, Comprehensive Management of Spinal Disorders, Continuing Education Course, Pittsburgh, Pennsylvania.

July 26-28, 2001	Chairman, Sulzer Spine-Tech Center of Excellence Course, Pittsburgh, Pennsylvania.
November 14-17, 2001	Chairman, Sulzer Spine-Tech Center of Excellence Course, Pittsburgh, Pennsylvania.
Sept. 29-Oct. 4, 2001	Congress of Neurological Surgeons: Co-Chairman, Sergeant-at-Arms Committee, San Diego, California.
2002	Congress of Neurological Surgeons: Co-Chairman, Sergeant-at-Arms Committee, Philadelphia, Pennsylvania.
2002	North American Spine Society Spine Research Foundation volunteer.
April 12-21, 2002	Chairman, Sulzer Spine-Tech Center of Excellence Course, Pittsburgh, Pennsylvania.
July 25-28, 2002	Moderator, Advancements in Spine 2002, sponsored by Sulzer Spine-Tech, Las Vegas, Nevada.
2003	Joint Section of Neurotrauma and Critical Care AANS/CNS Executive Committee (Educational Section)
2003-2006	Outcomes Compendium Task Force of the North American Spine Society (NASS).
April 11-12, 2003	Chairman, Centerpulse Dynesys® Spinal Program, Clinical IDE Surgeon Program, Pittsburgh, Pennsylvania.
July 24-26, 2003	Chairman, Centerpulse Center of Excellence Program, Pittsburgh, Pennsylvania.
October 10-12, 2003	Chairman, Centerpulse Center of Excellence Program, Pittsburgh, Pennsylvania.
2004-2006	AANS/CNS Devices Forum.
February 28-29, 2004	Co-Chairman, Management of the Critical Care Patient, Pittsburgh, Pennsylvania.
March 31-April 2, 2004	Chairman, Zimmer Spine Center of Excellence Program, Pittsburgh, Pennsylvania.
August 5-6, 2005	Chairman, Zimmer Spine Center of Excellence Program, Pittsburgh, Pennsylvania.
August 26-27, 2005	Chairman, Zimmer Spine Center of Excellence Program, Pittsburgh, Pennsylvania.
December 17-18, 2005	Co-Chairman, Management of the Critical Care Patient, San Francisco, California.
April 1-2, 2006	Co-Chairman, Management of the Critical Care Patient, Toronto, Ontario, Canada.
2005 - 2006	American College of Surgeons Committee on Applicants.
Jan. 1, 2006- Dec. 31, 2008	Pennsylvania Neurosurgical Society Executive Council Member-at-Large.
July 28, 2007	Moderator, Spine Course, Pennsylvania Neurosurgical Society, Hershey, Pennsylvania.
September 16, 2007	Organizer and Moderator, Lumbar Arthroplasty (PC 32), Congress of Neurological Surgeons Annual Meeting, San Diego, California
September 17, 2007	Organizer and Moderator, Management of Pseudarthrosis (M15), Congress of Neurological Surgeons Annual Meeting, San Diego, California
December 7, 2007	Moderator, Spine Session, 19 th Annual Pan-Philadelphia Neurosurgical Meeting, The Union League, Philadelphia, Pennsylvania
July 13, 2007- July 11, 2009	Pennsylvania Neurosurgical Society, Scientific Committee Director.

Bibliography: (Include only relevant publication categories. While the precise format can be individualized, each entry should contain all authors and inclusive page numbers.)

Research Publications, peer reviewed (print or other media):

1. **Welch WC**, McBride M, Kido DK, Nelson CN. Moyamoya disease in an infant with autonomic dysfunction: angiographic and MRI Findings. J Child Neurol 3:110-113, 1988.
2. Bland LI, **Welch WC**, Okawara SH. Large cystic intraparenchymal brain metastasis from prostate cancer. Neuroradiology 34:70-72, 1992.
3. **Welch WC**, Kornblith PL, Bradley MK. Characterization of human gliomas using chemiluminescent identification and quantitation of intracellular proteins. ACS Surg Forum 43:532-535, 1992.
4. **Welch WC**, Oestreich HM, del Rowe J, Hirshfeld A, Kao MS, Michelsen WJ. Radiosurgery: a non-invasive method to treat lesions within the brain. Einstein Quart J Biol Me 11:2-6, 1993.
5. Kornblith PL, **Welch WC**, Bradley MK. The future of therapy for glioblastoma. Surgical Neurol 39:538-43, 1993.
6. **Welch WC**, Erhard R, Clyde B, Jacobs GB. Systemic malignancy presenting as neck and shoulder pain. Arch Phys Med Rehabil 75:918-20, 1994.
7. **Welch WC**, Kornblith PL, Zolock R, Goldfarb RH. A simplified in-vitro assay of cellular invasiveness. ACS Surg Forum 45:591-593, 1994.
8. Pollack IF, **Welch WC**, Jacobs GB, Janecka IP. Frameless stereotactic guidance: an intraoperative adjunct in the transoral approach for ventral cervicomedullary junction compression. Spine 20:216-220, 1995.
9. *Resnick DK, Comey CH, **Welch WC**, Martinez AJ, Hoover WW, Jacobs GB. Isolated toxoplasmosis of the thoracic spinal cord in a patient with acquired immunodeficiency syndrome. J Neurosurg 82:493-496, 1995.
10. **Welch WC**, Morrison RS, Gross JL, Gollin SM, Kitson RB, Goldfarb RH, Giuliano KA, Bradley MK, Kornblith PL. Morphologic, immunologic, biochemical and cytogenetic characteristics of the human glioblastoma-derived cell line, SNB-19. In Vitro Cell Dev Biol 31:610-616, 1995.
11. *Przybylski GJ, **Welch WC**. Longitudinal atlanto-axial dislocation with type III odontoid fracture: a case report with review of the literature. J Neurosurg 84:666-670, 1996.
12. Rose RD, **Welch WC**, Balzer JR, Jacobs GB. Persistently electrified pedicle stimulation instruments (PEPSI) in spinal instrumentation: technique and protocol development. Spine 3:334-343, 1997.
13. Spearman MP, Jungreis CA, Wehner JJ, Gerszten PC, **Welch WC**. Endovascular thrombolysis in deep cerebral venous thrombosis. AJNR 18:502-506, 1997.
14. **Welch WC**, Subach BS, Pollack IP, Jacobs GB. Frameless stereotactic guidance for surgery of the upper cervical spine. Neurosurgery 40:958-964, 1997.
15. **Welch WC**, Rose RD, Balzer JR, Jacobs GB. Evaluation with evoked and spontaneous electromyography during lumbar instrumentation: a prospective study. J Neurosurg 87:397-402, 1997.
16. Fritz JM, Erhard RE, Delitto A, **Welch WC**, Nowakowski, PE. Preliminary results of the use of a two-stage treadmill test as a clinical diagnostic tool in the differential diagnosis of lumbar spinal stenosis. J Spine Disord 10:410-416, 1997.
17. *Gerszten PC, **Welch WC**, Spearman MP, Jungreis CA, Redner RL. Isolated deep cerebral vein thrombosis treated by direct endovascular thrombolysis. Surg Neurol 48:261-266, 1997.
18. *Bonaroti EA, **Welch WC**. Posterior epidural migration of an extruded lumbar disc fragment causing cauda equina syndrome: clinical and MRI evaluation. Spine 23:378-381, 1998.
19. Rose RD, **Welch WC**, Donaldson WF. Correlation of intraforaminal screw removal with SEP improvement. Arch Phys Med Rehabil 79:226-229, 1998.

20. Watanabe T, Vaccaro AR, Kumon H, **Welch WC**, Rivas DA, Chancellor MB. High incidence of occult neurogenic bladder dysfunction in neurologically intact patients with thoracolumbar spinal injuries. J Urol 159:965-968, 1998.
21. Balzer JR, Rose RD, **Welch WC**, Sciabassi RJ. Simultaneous somatosensory evoked potential and electromyographic recordings during lumbosacral decompression and instrumentation. Neurosurgery 42:1318-1325, 1998.
22. Fritz JM, Delitto A, **Welch WC**, Erhard RE. Lumbar spinal stenosis: a review of current concepts in evaluation, management and outcome measurements. Arch Phys Med Rehabil 79:700-708, 1998.
23. *Firlik AD, **Welch WC**. Brown-Séquard syndrome in the MRI era. Images in clinical medicine. New Engl J Med 340:285, 1999.
24. *Wahlig J, **Welch WC**, Kang J, Jungreis CA. Cervical intrathecal catheter placement for cerebrospinal fluid drainage. Neurosurgery 44:419-421, 1999.
25. Williams RL, Fukui MB, Meltzer CC, Swarnkar A, Johnson DW, **Welch WC**. MR imaging of fungal spinal osteomyelitis in the immunocompromised patient. AJNR 20:381-385, 1999.
26. **Welch WC**, Kornblith PL, Zimmerman HR, Bradley MK. Variability of intracellular concentrations of basic fibroblast growth factor in cultured human gliomas. In Vivo 13:109-118, 1999.
27. **Welch WC**, Kornblith PL, Michalopoulos GK, Peterson BE, Beedle A, Gollin SM, Goldfarb RH. Hepatocyte growth factor (HGF) and Receptor (c-met) in normal and malignant astrocytic cells. Anticancer Res 19:1635-1640, 1999.
28. *Resnick NM, Resnick DK, **Welch WC**, Cooper DL. Differential expressions of CD44 variants in tumors affecting the central nervous system. Mol Diagn 4:219-232, 1999.
29. *Scarrow AM, Colina JL, Levy EI, **Welch WC**. Thyroid carcinoma with isolated spinal metastasis: case history and review of the literature. Clinical Neurol Neurosurg 101:245-248, 1999.
30. Baumann SB, **Welch WC**, Bloom MJ. Intraoperative SEP detection of ulnar nerve compression or ischemia in an obese patient: a unique complication associated with a specialized spinal retraction system. Arch Phys Med Rehab 81:130-132, 2000.
31. *Wahlig JB, **Welch WC**, Weigel TL, Luketich J. Micro-invasive transaxillary thoracoscopic sympathectomy: technical note. Neurosurgery 46:1254-1258, 2000.
32. *Gerszten PC, **Welch WC**. The current surgical management of metastatic spine disease. Oncology 14:1013-1024 (reviewed on pages 1024-1033), 2000.
33. *Scarrow AM, Rajendran P, **Welch WC**. Brief report: glioblastoma multiforme of the conus medullaris. Acta Neurochir 102:166-167, 2000.
34. *Stevenson KL, **Welch WC**. Smiling odontoid. J Neurol Neurosurg Psychiatry 71:706, 2001.
35. Gerszten PC, Witham TF, Clyde BL, **Welch WC**. Relationship between type of health insurance and time to inpatient rehabilitation placement for surgical subspecialty patients. Am J Med Qual 16:212-215, 2001.
36. Stefanik DF, Fellows WK, Rizkalla LR, Rizkalla WM, Stefanik PP, Deleo AB, **Welch WC**. Monoclonal antibodies to vascular endothelial growth factor (VEGF) and the VEGF receptor, FLT-1, inhibit the growth of C6 glioma in a mouse xenograft. J Neurooncol 55:91-100, 2001.
37. *Scarrow AM, Levy EI, Gerszten PC, Kulich SM, Chu CT, **Welch WC**. Epidermoid cyst of the thoracic spine: case history. Clin Neurol Neurosurg 103:220-222, 2001.
38. Kassam AB, Carrau RL, Horowitz M, Snyderman C, Hirsch BE, **Welch WC**. The role of fibrin sealants in cranial-base surgery. Web MD Medscape Health Network, Medscape Portals Medical Education Collaborative, Medscape Neurology and Neurosurgery Feb. 27:1-14, 2002.
39. **Welch WC**, Cornwall GB, Toth JM, Turner AS, Thomas KA, Gerszten PC, Nemoto EM. Use of polylactide resorbable films as an adhesion barrier. Orthopedics 25:s1121-1130, 2002.

40. **Welch WC**, Gerszten PC. Alternative strategies for lumbar discectomy: Intradiscal electrothermy and nucleoplasty. Neurosurg Focus 13:1-6, 2002.
41. **Welch WC**, Thomas KA, Cornwall GB, Gerszten PC, Toth JM, Nemoto EM, Turner AS. Use of polylactide resorbable film as an adhesion barrier. Journal of Neurosurgery: Spine (duplicate publication at the request of the editors and publisher) 97:413-422, 2002 (cover article/picture).
42. Horowitz MB, Jovin T, **Welch WC**, Kassam AB. Bow hunter's syndrome in the setting of contralateral vertebral artery stenosis: evaluation and treatment options. Spine 27:E495-498, 2002.
43. Gerszten PC, Kalnicki S, Ozhasoglu C, **Welch WC**, Burton S. Feasibility of frameless single fraction stereotactic radiosurgery for spinal lesions. Neurosurg Focus 13:1-6, 2002.
44. Gerszten PC, **Welch WC**, McGrath PM, Willis SL. A prospective outcomes study of patients undergoing intradiscal electrothermy (IDET) for chronic low back pain. Pain Physician 5:360-364, 2002.
45. Kassam AB, Carrau RL, Horowitz M, Snyderman C, Hirsch BE, **Welch WC**, Fang Y. The use of Tisseel fibrin sealant in neurosurgical procedures: incidence of cerebrospinal fluid leak and cost-benefit analysis. Neurosurgery 52:1102-1105, 2003.
46. Gerszten PC, Ozhasoglu C, Burton S, Vogel WJ, Atkins BA, Kalnicki S, **Welch WC**. CyberKnife frameless single-fraction stereotactic radiosurgery for benign lesions of the spine. Neurosurgical Focus 14:1-5, 2003.
47. Gerszten PC, Ozhasoglu C, Burton SA, Vogel WJ, Atkins BA, Kalnicki S, **Welch WC**. Evaluation of CyberKnife real-time image-guided stereotactic radiosurgery for spinal lesions. Stereotactic and Functional Neurosurgery 81:84-89, 2003.
48. Gerszten PC, **Welch WC**, Moossy, JJ, Flickinger J. Low-dose radiotherapy for the inhibition of peridural fibrosis after re-exploratory nerve root decompression for the post-laminectomy syndrome. J Neurosurg: Spine 99:271-277, 2003
49. Gerszten PC, Ozhasoglu C, Burton S, **Welch WC**, Vogel WJ, Atkins BA, Kalnicki S. CyberKnife frameless single-fraction stereotactic radiosurgery for tumors of the sacrum. Neurosurgical Focus 15 (2):1-5, 2003.
50. Gerszten PC, **Welch WC**. CyberKnife radiosurgery for the spine. Techniques in Neurosurgery 9:232-241, 2003.
51. Erhard RE, **Welch WC**, Liu B, Vignovic M. Far-lateral disc herniation: Case report, review of the literature, and a description of non-surgical management. J Manip Physiol Ther 27:123-128, 2003.
52. Rykien T, Eichholz KM, Gerszten PC, **Welch WC**, Gokaslan ZL, Resnick D. Evidence-based review of the surgical management of vertebral column metastatic disease. Neurosurgical Focus 15:1-10, 2003.
53. Vitaz TW, Oishi M, **Welch WC**, Gerszten PC, Disa JJ, Bilsky MH. Rotational and transposition flaps for the treatment of spinal wound dehiscence and infections in degenerative and oncological patient populations. J Neurosurg: Spine 100:46-51, 2004 (cover article/picture).
54. Klopp LS, **Welch WC**, Tai J, Toth JM, Cornwall GB, Turner AS. Use of polylactide resorbable film as a barrier to postoperative peridural adhesions in an ovine laminectomy model. Neurosurgical Focus 16:1-9, 2004.
55. Kassam AB, Nemoto E, Balzer JR, Rao G, **Welch WC**, Kuwabara H, Boada F, Horowitz MB. Effects of Tisseel fibrin glue on the central nervous system of non-human primates. ENT-Ear, Nose and Throat Journal 83:246-256, 2004
56. Gerszten PC, Ozhasoglu C, Burton S, Vogel WJ, Atkins BA, Kalnicki S, **Welch WC**. CyberKnife frameless stereotactic radiosurgery for spinal lesions: Clinical experience in 125 cases. Neurosurgery 55:89-99, 2004.
57. **Welch WC**, Willis S, Gerszten PC. Implantable direct current stimulation in para-axial cervical arthrodesis. Advances in Therapies 29:389-400, 2004.

58. Gerszten PC, Germanwala A, Burton SA, **Welch WC**, Ozhasoglu C, Vogel WJ. Combination kyphoplasty and spinal radiosurgery: a new minimally invasive treatment paradigm for pathological fractures. Neurosurgery Focus **E(8)**:1-6, 2005.
59. **Welch WC**, Gerszten PC. Accuray CyberKnife image-guided radiosurgical system. Future Drugs Limited: Expert Review of Medical Devices (www.future-drugs.com) **2**:141-147, 2005.
60. Kassam AB, Patel A, **Welch WC**, Snyderman C, Hirsch B, Carrau R. The carotid-vertebral space: An "extended" lateral window to the ventromedial cranial base and lower craniocervical junction. ENT-Ear Nose and Throat Journal **84**:312-315, 2005.
61. *Harris AE, Hennicke C, Byers K, **Welch WC**. Postoperative discitis due to *Propionibacterium* *acnes*: a case report and review of the literature. Surgical Neurology **63**:538-541, 2005.
62. Gerszten PC, Germanwala A, Burton SA, **Welch WC**, Ozhasoglu C, Vogel WJ. Combination kyphoplasty and spinal radiosurgery: a new minimally invasive treatment paradigm for pathological fractures. Neurosurgery Focus **E(8)**:1-6, 2005.
63. *Chen JJ, Branstetter BF, Puswella AL, **Welch WC**: Multiple posterior vertebral fusion abnormalities: A case report and review of the literature. American Journal of Roentgen **186**:1256-1259, 2006.
64. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, **Welch WC**, Baar J, Friedland DM. Stereotactic radiosurgery for spine metastases from renal cell carcinoma. Journal of Neurosurgery: Spine **3**:288-295, 2005.
65. Gerszten PC, Germanwala A, Burton SA, **Welch WC**, Ozhasoglu C, Vogel WJ. Combination kyphoplasty and spinal radiosurgery: a new treatment paradigm for pathological fractures. Journal of Neurosurgery: Spine **3**:296-301, 2005.
66. Bhatnagar AK, Gerszten PC, Ozhasaglu C, Vogel WJ, Kalnicki S, **Welch WC**, Burton SA. Cyberknife frameless radiosurgery for the treatment of extracranial benign tumors. Technology in Cancer Research and Treatment **4**:1-6, 2005.
67. *Burke JP, Gerszten PC, **Welch WC**. Iatrogenic vertebral artery injury during anterior cervical surgery. The Spine Journal **5**:508-514, 2005.
68. Kassam A, Horowitz M, **Welch WC**, Sclabassi R, Carrau R, Snyderman C, Hirsch B. The role or endoscopic assisted microneurosurgery (image fusion technology) in the performance of neurosurgical procedures. Minimally Invasive Neurosurgery **48**:191-196, 2005.
69. Gerszten PC, Burton SA, **Welch WC**, Brufsky AM, Lembersky BC, Ozhasoglu C, Vogel WJ. Single fraction radiosurgery for the treatment of spinal breast metastases. Cancer **14**:2244-2254, 2005.
70. Gerszten PC, **Welch WC**, King JT. Quality of life assessment in patients undergoing percutaneous discectomy using the nucleoplasty technique. Journal of Neurosurgery: Spine **4**:36-42, 2006.
71. *Khan MH, Smith PN, Balzer JR, Crammond D, **Welch WC**, Gerszten PC, Sclabassi RJ, Kang JD, Donaldson WF. Intraoperative somatosensory evoked potential monitoring during cervical spine corpectomy surgery-experience with 508 cases. Spine **31**:E105-E113, 2006.
72. Slivka MA, Spenciner D, Seim HB, **Welch WC**, Serhan S, Turner AS. High rate of fusion in sheep cervical spines following anterior interbody surgery with absorbable and non-absorbable implant devices. Spine **31**:2772-2777, 2006.
73. Gerszten PC, Burton SA, Belani CP, Ramalingam S, Friedland DM, Ozhasoglu C, Quinn AE, **Welch WC**. Radiosurgery for the treatment of spinal lung metastases. Cancer **107/11**:2653-2661, 2006.
74. Gerszten PC, Burton SA, Ozhasglu C, **Welch WC**. Radiosurgery for spinal metastases: clinical experience in 500 cases from a single institution. Spine **32**:193-199, 2007.
75. Gerszten PC, **Welch WC**: Combined percutaneous transpedicular tumor debulking and kyphoplasty for pathological compression fractures. Journal of Neurosurgery: Spine **6**:92-95, 2007.

76. Smith PN, Balzer J, Khan M, Davis RA, Crammond D, **Welch WC**, Gerszten PC, Kang JD, Sciabassi RJ, Donaldson WF. The utility of intraoperative somatosensory evoked potential monitoring during anterior cervical discectomy and fusion in non-myelopathic patients—A review of 1039 cases. The Spine Journal 7:83-87, 2007.
77. **Welch WC**, Cheng BC, Awad TE, Davis R, Maxwell JH, Delmarter R, Wingate JK, Sherman J, Macenski MM. Clinical outcomes of the Dynesys Dynamic Neutralization System: One-year preliminary results from a Food and Drug Administration Investigational Device Exemption clinical trial. Neurosurgical Focus 22:E8, 2007.
78. **Welch WC**, Ong J, Gerszten PC, Nestler AJ, Burke JP, Cheng BC. “Radiographic and clinical observations of screw back out in cervical instrumentation construct failures.” Advances in Therapy 24:415-426, 2007.
79. *Rabin A, Gerszten PC, Karausky P, Erhard R, Bunker CH, Potter DM, **Welch WC**. The diagnostic accuracy of the seated straight leg raise test compared to the supine straight leg raise test in detecting acute radiculopathy.” Archives of Physical Medicine and Rehabilitation 88:840-843, 2007.
80. Cheng BC, Dawson J, Jensen L, Gordon J, Cheng J, **Welch WC**. “Immediate biomechanical effects of lumbar posterior dynamic stabilization above a circumferential fusion.” In press for The Spine Journal.
81. Cheng BC, **Welch WC**, Serhan H, Cunningham, B. “The effects of intermediate fixation of occipital-cervico-thoracic fixation in a cadaveric model. In press for Journal of Neurosurgery: Spine.
82. Gerszten PC, Lehmann E, Ozhasoglu C, Burton SA, **Welch WC**. Radiation dose tolerance of the spinal cord and cauda equina to Cyberknife spinal radiosurgery. In press for Neurosurgery.

*The first author is a student, resident, fellow, or research associate of Dr. Welch, writing the manuscript in the course of his or her training.

Refereed Articles Submitted for Publication:

1. Goldstein I, Oishi M, Heyman R, Doyle J, Gerszten PC, **Welch WC**. “Cervical decompression in patients with ALS, MS and spino-cerebellar degeneration.” Submitted to Neurology.
2. Jankowitz BT, Atteberry DS, Gerszten PC, Karausky P, Cheng BC, Faught R, **Welch WC**: “Incidence and repair of durotomy during lumbar spinal surgery.” Submitted to The Spine Journal.
3. Klopp LS, Toth JM, **Welch WC**, Tai JT, Thomas KA, Turner S. “Application of a Bioresorbable Film for the Prevention of Adhesion to the Retroperitoneal Tissues to the Anterior Vertebral Body following Anterolateral Discectomy.” Submitted to Spine.
4. Cheng BC, Awad TEEE, Davis R, DelMarter R, Winfield D, **Welch WC**. “Radiographic Analysis of a Motion Preservation Device (Dynesys): 1-year Results from a Multicenter IDE Trial.” Submitted to Neurosurgery Spine.
5. Williams K, Welch WC. “Osteoinductive Bone Graft Substitutes for Lumbar Fusion-A Systemic Review.” Submitted to XXX

Poster or Oral Publications (last 3 years):

1. Gerszten PC, **Welch WC**, Burton S, Ozhasoglu C. “CyberKnife Frameless Stereotactic Radiosurgery for the Treatment of Tumors of the Cervical Spine.” Oral presentation at the Annual Cervical Spine Research Society Meeting, Boston, MA, December 10, 2004.

2. Smith PN, Balzer J, Shimer A, Davis RA, **Welch WC**, Gerszten PC, Kang JD, Donaldson WF. "The Utility of Somatosensory-Evoked Potential Monitoring During Anterior Cervical Discectomy and Fusion Surgery for Radiculopathy." Oral presentation at the Annual Cervical Spine Research Society Meeting, Boston, MA, December 10, 2004.
3. Kassam AB, **Welch WC**, Gerszten PC, Snyderman CH. "Image-Guided, Endoscopically-Assisted, Transnasal Odontoid Resection." Oral presentation at the Annual Cervical Spine Research Society Meeting, Boston, MA, December 10, 2004.
4. **Welch WC**, Osterberg J, Dawson JW. "Dynamic Neutralization of the Lumbar Spine." Oral presentation at the 2005 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado, March 2, 2005.
5. **Welch WC**, Ong J, Gerszten PC, Nestler AN, Burke JP. "Anterior Cervical Instrumentation Failure." Oral presentation at the 2005 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado, March 4, 2005.
6. **Welch WC**. "Fusion Adjuncts: Electrical Stimulation." Oral presentation at the 2005 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado, March 4, 2005.
7. **Welch WC**, Gerszten PC, Cheng BC. "Lumbar Biomechanics: Non-Fusion Device." Oral presentation at the 2006 Winter Clinics, Snowmass Conference Center, Snowmass Village, Colorado, February 26-March 3, 2005.
8. Gerszten PC, King JT, **Welch WC**, Justice JC. "Outcomes Evaluation of the Hydrosorb™ Shield for the Prevention of Recurrent Post-Laminectomy Peridural Fibrosis." Poster presentation at the Annual Meeting of the CNS/AANS, Phoenix, AZ, March 9-12, 2005.
9. Gerszten PC, King JT, **Welch WC**, Justice JC. "Percutaneous Disc Decompression Using the Nucleoplasty Technique." Poster presentation at the Annual Meeting of the CNS/AANS, Phoenix, AZ, March 9-12, 2005.
10. Goldstein IM, Oishi M, Gerszten PC, Heyman R, Doyle J, **Welch WC**. "Decompressive Cervical Spine Surgery in Patients with Amyotrophic Lateral Sclerosis." Poster presentation at the Annual Meeting of the CNS/AANS, Phoenix, AZ, March 9-12, 2005.
11. **Welch WC**. "Complication Avoidance and Management in Metastatic Spine Surgery." Oral presentation at the Annual Meeting of the CNS/AANS, Phoenix, AZ, March 9, 2005.
12. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, **Welch WC**, Baar J, Friedland DM. "Spinal Radiosurgery: A Successful Treatment Option for Spine Tumors." Oral presentation at the Annual Meeting of the CNS/AANS, Phoenix, AZ, March 10, 2005.
13. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, **Welch WC**, Baar J, Friedland DM. "Stereotactic Radiosurgery for Spine Metastases from Renal Cell Carcinoma." Oral presentation at the Annual Meeting of the American Association of Neurological Surgeons, New Orleans, LA, March 18, 2005.
14. Gerszten PC, King JT, **Welch WC**, Justice JC. "Outcomes Evaluation of Percutaneous Disc Decompression Using Nucleoplasty." Poster presentation at the Annual Meeting of the American Association of Neurological Surgeons, New Orleans, LA, March 17-21, 2005.
15. Ong, J, **Welch WC**, Gerszten PC, Nestler A, Burke J. "In vivo Evaluation of Anterior Cervical Plate Failure." Poster presentation at the Annual Meeting of the American Association of Neurological Surgeons, New Orleans, LA, March 17-21, 2005.
16. **Welch WC**, Sharts M. "Science of Bone Biologics." Oral presentation at the Neurosurgery Residents Spine Education Summit, sponsored by DePuy Spine, Phoenix, Arizona, April 1-2, 2005.
17. Klopp LS, **Welch WC**, Tai J, Toth JM, Cornwall GB, Turner AS. "Polylactide Resorbable Polymer Film Reduces Adhesions to the Ventral Sheep Spine." Poster presentation at the 2005 Society of Biomaterials Annual Meeting and Exposition: New Applications and Technologies, Memphis, Tennessee, April 27-30, 2005.
18. Gerszten PC, **Welch WC**, King JT, Justice JC. "Outcomes Evaluation of Percutaneous Disc Decompression Using Nucleoplasty." Annual Meeting of the Pennsylvania Neurosurgical Society, Harrisburg, Pennsylvania, July 16, 2005.

19. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, Quinn AE, **Welch WC**. Single fraction spinal radiosurgery for the treatment of spinal metastases. 7th International Stereotactic Radiosurgery Society Congress. Brussels, Belgium. September 11, 2005.
20. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, **Welch WC**. Spinal radiosurgery using the CyberKnife for spine metastases. 20th Annual Meeting of the North American Spine Society. Philadelphia, PA. September 30, 2005.
21. Gerszten PC, Ozhasoglu C, Burton SA, Vogel WJ, Quinn AE, **Welch WC**, Justice JC. "Spinal Radiosurgery using the CyberKnife for Spinal Metastases." Poster presentation at the North American Spine Society (NASS) Annual Meeting 20th Annual Meeting, Philadelphia, Pennsylvania Sept 28-October 1, 2005.
22. **Welch WC**, Gatchel R, Karausky P, Herkowitz H, Maiman D, Phillips F, Wetzel FT, Carragee E, Matthews H. A Retrospective Study Examining Five-Year Post-Surgical Outcomes of Virgin Discectomy Patients." Oral presentation at the North American Spine Society (NASS) Annual Meeting 20th Annual Meeting, Philadelphia, Pennsylvania Sept 28, 2005.
23. Gerszten PC, Burton SA, **Welch WC**, Brufsky AM, Lembersky BC, Cihat Ozhasoglu, Vogel WJ. Single fraction radiosurgery for the treatment of breast metastases. 54th Annual Meeting of the Congress of Neurological Surgeons, Boston, MA. October 12, 2005.
24. Slivka MA, Spenciner D, Seim HB, **Welch WC**, Serhan H, Turner AS. "High Rate of Fusion in Sheep Cervical Spines following Anterior Interbody Surgery with Absorbable and Non-Absorbable Implant Devices." Oral presentation (#57) at the Annual Cervical Spine Research Society Meeting, San Diego, CA, MA, December 7, 2005.
25. **Welch WC**, Fellows-Mayle W, Sharts M, Hamilton R, Gerszten PC, Karausky P, Balzer, JR. "Evaluation of the Misonix Ultrasound Osteotome Device in Sheep Laminectomies." Poster presentation (#335) at the Annual Meeting of the CNS/AANS Section on Disorders of the Spine and Peripheral Nerves, Lake Buena Vista, FL, March 9-16, 2006.
26. Gerszten PC, Burton SA, **Welch WC**, Ozhasogl C, McCue KJ, Quinn AE. "Cyberknife Spinal Radiosurgery for Benign Tumors of the Spine." Presented at the Fifth Annual CyberKnife User's Meeting, San Diego, CA, January 26, 2006.
27. Jensen L, **Welch WC**, Cheng BC, Dawson J. "Unilateral Posterior Oblique Lumbar Interbody Instrumentation with Non-Rigid versus Rigid Posterior Fixation: An In Vitro Kinematic Study." Oral presentation at the International Intradiscal Therapy Society Meeting, Phoenix, AZ, April 8, 2006.
28. Gerszten PC, Burton SA, Belani CP, Ramalingam S, Friedland, DM, **Welch WC**. "Single Fraction Radiosurgery for the Treatment of Spinal Metastases from Lung Cancer." Oral presentation at the American Association of Neurological Surgeons Annual Meeting, San Francisco, California, April 22-27, 2006.
29. **Welch WC**, Gerszten PC, Cheng BC. "Posterior Lumbar Motion Preservation." Oral presentation at the Temple University School of Medicine 2nd Annual Spine Symposium, Philadelphia, PA, May 5-6, 2006.
30. Cheng BC, **Welch WC**, Cheng JS, Gordon JD. "Contributions of a Non-Rigid Fixation System to Adjacent-Level Lumbar Motion above Circumferential Fusion." Oral presentation at the 6th Annual Spine Arthroplasty Society, Montreal, CN, May 13, 2006.
31. Delamarter R, Maxwell J, Davis R, Sherman J, **Welch WC**. "Non-fusion Application of the Dynesys System in the Lumbar Spine: Early Results from the IDE Multicenter Trial." Poster presentation at the 6th Annual Spine Arthroplasty Society, Montreal, CN, May 13, 2006.
32. Sharts M, Cheng BC, **Welch WC**, Gerszten PC, Vanderby R, Oza A. "Biomechanical Performance of a Duo-Polymer Cervical Artificial Disc." Oral presentation at the 6th Annual Spine Arthroplasty Society, Montreal, CN, May 13, 2006.
33. Cheng BC, **Welch WC**, Cheng JS, Gordon JD. "Biomechanical Performance of a Duo-Polymer Motion Preservation Device for the Cervical Spine." Oral presentation at the 2006 Bioengineering Conference, Amelia Island, Florida, June 21-24, 2006.

34. Cheng BC, Chough C-K, Sharts M, Karausky P, Oza A, Blumenthal S, **Welch WC**. "Biomechanical Performance of a Duo-Polymer Cervical Artificial Disc." Poster presentation at the Spine Across the Sea Annual Meeting, Maui, HI, July 13, 2006.
35. Cheng BC, **Welch WC**. "Biomechanics of Motion Preservation Devices." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, PA, July 14, 2006.
36. **Welch WC**, Cheng BC, Gerszten PC. "Dynesys Spinal Instrumentation System." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, PA, July 14, 2006.
37. **Welch WC**. "TTL Rod Technology." Oral presentation at the Pennsylvania Neurosurgical Society Annual Meeting, Hershey, PA, July 14, 2006.
38. **Welch WC**, Cheng BC. "Cervical Arthroplasty: Review." Oral presentation at The Winter Clinics for Cranial and Spinal Surgery, Snowmass, CO, March 1, 2007.
39. Faught RW, Pirris SM, **Welch WC**, Cheng BC. "Comparison between In Vivo and In Vitro Sheep Spine." Digital Poster at the AANC/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Phoenix, AZ, March 7-10, 2007.
40. **Welch WC**, Sherman J, Wingate JK, Maxwell J, Delamarter R, Davis R, Cheng BC. "Dynamic Stabilization: A Preliminary In Situ Quantitative Dynamic Analysis of Flexion Extension Radiographs from the US IDE trial." Poster presentation at the AANS Annual Meeting, Washington DC, April 14-19, 2007.
41. **Welch WC**, Delamarter R, Maxwell J, Wingate JK, Davis R, Sherman J, Cheng BC. "Maintenance of Disc Height and Lordosis Following Dynamic Stabilization with the Dynesys Spinal System" Poster presentation at the AANS Annual Meeting, Washington DC, April 14-19, 2007.
42. Spehar JL, Hamilton RL, Karausky PL, Gerszten PC, **Welch WC**, Cheng BC. "Preliminary Histological Evaluation of the Chronic Tissue Response to a Cervical Disc." Poster presentation at the Spinal Arthroplasty Society, Berlin, Germany, May 1-4, 2007.
43. Cheng BC, Vanderby R, **Welch WC**. "Design and Characterization of a Cervical Motion Preservation Device." Poster presentation at the Spinal Arthroplasty Society, Berlin, Germany, May 1-4, 2007.
44. Wingate JK, Davis R, Maxwell J, Sherman J, **Welch WC**, Delamarter R, Macenski M. "Maintenance of Disc Height and Lordosis Following Dynamic Stabilization with the Dynesys Spinal System." Poster presentation at the Spinal Arthroplasty Society, Berlin, Germany, May 1-4, 2007.
45. Davis R, Maxwell R, Delamarter R, Sherman J, **Welch WC**, Wingate JK. "Dynamic Stabilization: A Preliminary In-Situ Quantative Dynamic Analysis of Flexion-Extension Radiographs from the US IDE Trial." Podium presentation at the Spine Arthroplasty Society, Berlin, Germany, May 1-4, 2007.
46. Sherman J, Davis R, Delamarter R, **Welch WC**, Maxwell JH, Wingate JK. "Dynamic Stabilization with the Dynesys Spinal System, Preliminary Outcomes for 101 Patients from 6 IDE Surgical Sites." Poster presentation at the Spinal Arthroplasty Society, Berlin, Germany, May 1-4, 2007.
47. **Welch WC**, Wingate JK, Delamarter R, Cheng BC, Maxwell JH, Davis R, Sherman J. "Maintenance of Disc Height and Lordosis following Dynamic Stabilization with the Dynesys Spinal System." Poster presentation at the 56th Annual Meeting of the Congress of Neurological Surgeons, San Diego, California. September 15-20, 2007.
48. Davis R, Sherman J, Maxwell J, Delamarter R, Wingate J, **Welch WC**. "Preliminary Clinical Outcomes from the US FDA Investigational Device Exemption (IDE) Study of the Dynesys Dynamic Stabilization System." Poster presentation at the 56th Annual Meeting of the Congress of Neurological Surgeons, San Diego, California. September 15-20, 2007.
49. Maxwell JH, Davis R, Wingate JK, Sherman J, **Welch WC**, Delamarter R. "Dynamic Stabilization: A Preliminary In Situ Quantitative Dynamic Analysis of Flexion Extension Radiographs from the US IDE Trial." Digital poster presentation at the 56th Annual

Meeting of the Congress of Neurological Surgeons, San Diego, California. September 15-20, 2007.

50. Sherman J, Maxwell J, Delamarter R, Davis R, Wingate J, **Welch WC**. "Preliminary Clinical Outcomes from the FDA IDE Study of a Dynamic Posterior Stabilization System." North American spine Society (NASS) 22nd Annual Meeting, Austin, Texas, October 10, 2007.
51. Jankowitz BT, Atteberry DS, Gerszten PC, Karausky P, Cheng BC, Faught R, **Welch WC**: "Incidence and Repair of Durotomy During Lumbar Spinal Surgery." Oral Platform Presentation at the Annual Meeting of the CNS/AANS Section on Disorders of the Spine and Peripheral Nerves, Lake Buena Vista, FL, XXX, 2008.
52. **Welch, WC, XXX/** "Dynamic Stabilization with the Dynesys System: Maintenance of Disc Height and Lumbar Lordosis." Electronic poster presentation at the Annual Meeting of the American Association of Neurological Surgeons, Chicago, IL.
53. Cheng BC, Sephar J, Burns P, **Welch WC**. "Biomechanical Stability Characteristics of Cervical Fixation Devices." Electronic poster presentation at the Annual Meeting of the American Association of Neurological Surgeons, Chicago, IL.

Contributions to peer-reviewed clinical research publications, participation cited but not by authorship:

1. Zhang JG, Eguchi J, Kruse CA, et al. "Antigenic profiling of glioma cells to generate allogenic vaccines or dendritic cell-based therapeutics." Clin Cancer Res 13: 566-575, 2007. (Contribution: cell line SNB-19, cited in text.)

Thesis:

1. Nowakowski PE, Erhard RE, Delitto A, **Welch WC**. "Development of a clinical diagnostic tool to identify neurogenic claudication." Master's thesis, University of Pittsburgh, School of Physical Therapy, June, 1996.

Thesis advisor:

2. Awad TEEE. Evaluation of posterior lumbar interbody fusion with carbon fiber cage versus with bone graft." Doctorate thesis, Suez Canal University, December, 2006.

Research Publications, non-peer reviewed:

1. **Welch WC**, Jacobs GB. Introduction. J Neurooncol 23:97, 1995.
2. **Welch WC**, Jacobs GB (guest editors). Surgery for metastatic spinal disease. J Neurooncol 23:163-170, 1995.
3. **Welch WC**, Jacobs GB. Conclusions. J Neurooncol 23:173-174, 1995.
4. Erhard RE, **Welch WC**, Delitto A. Grand Rounds Discussion. J NeuroMusculoskel System 4:30-39, 1996.
5. **Welch WC**, Ragoowansi A, Carrau RL. Transoral resection of the odontoid. Oper Tech Orthop 8:8-12, 1998.
6. Patel A, **Welch WC**. Posterior lumbar interbody fusion using metallic cages: current techniques. Oper Tech Orthop 10:311-319, 2000.
7. **Welch WC**. New trends in lumbar disc disease. UPMC-HS Neurologic Surgery Newsletter 2, 1-2, 2001.
8. **Welch WC**. What is Spinal Stenosis? Pittsburgh Post-Gazette F-5, Tuesday October 9, 2001.
9. **Welch WC**, Gerszten PC. UPMC advances minimally invasive spine surgery techniques. UPMC-HS Neurologic Surgery Newsletter 3, 1, 6. 2002.

10. **Welch WC**, Gerszten PC. Intradiscal electrothermy (IDET), Nucleoplastytm offer promising options for lumbar disc disease treatment. UPMC-HS Neurologic Surgery Newsletter 3, 4, 2002.
11. **Welch WC**. Bone morphogenic proteins studied for use in spinal fusion. UPMC-HS Neurologic Surgery Newsletter 3, 6, 2002.
12. **Welch WC**, Balzer J. Intraoperative neurophysiologic monitoring improves safety. UPMC-HS Neurologic Surgery Newsletter 3, 6, 2003.
13. Krishnamurti U, **Welch WC**, Kassam A, Wiley CW. Case presentation and discussion of von Hippel Lindau disease. Web presentation for the Department of Pathology [http://path.up\[mc.edu/cases/case342.html](http://path.up[mc.edu/cases/case342.html), February 19, 2003.
14. Gerszten PC, **Welch WC**. New polymer film may remove painful scar tissue in spine surgery patients. UPMC-HS Neurologic Surgery Newsletter 5, 3, 2004.

Abstracts: (List only the past 3 years.)

1. **Welch WC**, Gerszten PC, Oishi M: Evaluation of the POLAr (Posterior Oblique Lumbar Arthrodesis) Lumbar Fusion Technique. Oral presentation at the 10th Annual Meeting of the Japan Society for the Study of Surgical Technique for Spine and Spinal Nerves, Toshi Center, Hirakawa-cho, Chiyoda-ku, Tokyo, Japan, September 26-27, 2003. p159.
2. Gerszten PC, Ozhasoglu C, Burton SA, Vogel WV, Atkins BA, Kalnicki S, **Welch WC**: CyberKnife frameless stereotactic radiosurgery for spinal lesions: Clinical experience in 125 cases International Journal of Radiation Oncology, Biology and Physics, 57:S370-S371, 2003.
3. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, **Welch WC**, Baar J, Friedland DM: Stereotactic Radiosurgery for Spine Metastases from Renal Cell Carcinoma. J. Neurosurgery 102:A782, 2005
4. Gerszten PC, Ozhasoglu C, Burton SA, Vogel WJ, Quinn AE, **Welch WC**, Justice JC. Spinal Radiosurgery using the CyberKnife for Spinal Metastases. The Spine Journal 5:13S, 2005.
5. **Welch WC**, Gatchel R, Karausky P, Herkowitz H, Maiman D, Phillips F, Wetzel FT, Carragee E, Matthews H. Retrospective Study Examining Five-Year Post-Surgical Outcomes of Virgin Discectomy Patients. The Spine Journal 5:80S, 2005.
6. Gerszten PC, Burton SA, Belani CP, Ramalingam S, Fienland DM, **Welch WC**. Single fraction radiosurgery for the treatment of spinal metastases from lung cancer. J Neurosurgery 104:A667, 2006.
7. Cheng BC, Gordon JD, Cheng JS, **Welch WC**. Biomechanics of a Lumbar Motion Segment above a Circumferentially Instrumented Motion Segment. 59th Annual Meeting of the Neurosurgical Society of America, June 4-7, 2006.
8. Davis RJ, Maxwell J Delamarter R, Wingate J, Sherman J, **Welch WC**. Dynamic Stabilization of the Lmbar Spine Using the Dynesys Spinal System: Early Results of the Multicenter Trial. The Spine Journal 6:77S, 2006.
9. Spehar JL, Hamilton RL, Karausky PL, Gerszten PC, **Welch WC**, Cheng BC. "Preliminary Histological Evaluation of the Chronic Tissue Response to a Cervical Disc." SAS Journal Abstract A-035-0003-00137 2007.
10. Cheng BC, Vanderby R, **Welch WC**. "Design and Characterization of a Cervical Motion Preservation Device." SAS Journal Abstract A-035-0003-00456 2007.
11. Sherman J, Maxwell J, Delamarter R, Davis R, Wingate J, **Welch W**. "Preliminary Clinical Outcomes from the US IDE Study of a Dynamic Posterior Stabilization System." The Spine Journal 7:80S, 2007.
12. Cheng BC, **Welch WC**. "Initial Observations in the Validation of a Hybrid Test Protocol for Motion Preservation Devices on a Biomechanical Spine Tester." Proceedings of the ASME Summer Bioengineering Conference (SBC2008-192467).

Book Chapters:

1. **W Welch WC**, Kornblith PL. "Chemotherapy of Brain Tumors: Fundamental Principles." In Brain Tumors. A Comprehensive Text. Morantz RA, Walsh JW (eds). New York: Marcel Dekker, Inc., 1994, Chapter 27, 717-729.
2. Hagberg CA, **Welch WC**, Bowman-Howard ML. "Anesthesia and Surgery for Spine and Spinal Cord Procedures." In Textbook of Neuroanesthesia. Albin MS (ed). Massachusetts: McGraw-Hill Inc., 1996, Chapter 32, 1039-1082.
3. **Welch WC**, Kornblith PL. "Cell Culture in Brain Tumors." In Cancer of the Nervous System. Black PM, Loeffler JS (eds). Cambridge: Blackwell Science, 1997, Chapter 43, 819-828.
4. **Welch WC**, "Surgical Management of Spinal Metastasis." In Advances in Neuro-Oncology II. Kornblith PL, Walker MD (eds). Mt. Kisko, New York: Futura Publications, Chapter 13, 259-281.
5. **Welch WC**, Kornblith PL. "Perfusional Therapy of Brain Metastases." In Regional Therapy of Advanced Cancer. Lotze MT, Rubin JT (eds). Philadelphia: JB Lippincott Co, 1997, Chapter 15, 195-204.
6. Kornblith PL, **Welch WC**. "Principles and Application of Chemotherapy in Brain Tumors." In Handbook of Clinical Neurology. Vinken PJ, Bruyn GW (eds). Elsevier, Amsterdam: Neuro-Oncology Part I, Volume 67, 1997, Volume 67, Chapter 13, 277-290.
7. Drennen K, **Welch WC**, Carrau RL. "Swallowing Disorders After Cervical Surgery." In Carrau RL, Murray T (eds). Comprehensive Management of Swallowing Disorders. San Diego: Singular Publishing Group, 1998, Chapter 25, 165-17.
8. **Welch WC**, Jacobs GB, Jackson RP. "Introduction and History of Spine Surgery." In Operative Spinal Surgery. Welch WC, Jacobs GB, Jackson RP (eds). Stamford: Appleton & Lange, 1999, Chapter 1, 1-2.
9. McDonald JV, **Welch WC**. "Patient History, General Physical Examination and Neurologic Examination with Studies." In Operative Spinal Surgery. Welch WC, Jacobs GB, Jackson RP (eds). Stamford: Appleton & Lange, Chapter 3, 13-26.
10. Przybylski G, **Welch WC**, Jacobs GB, "Spinal Instability and Biomechanics." In Operative Spinal Surgery. Welch WC, Jacobs GB, Jackson RP (eds). Stamford: Appleton & Lange, 1999, Chapter 7, 104-112.
11. Lovely TJ, **Welch WC**, Popp AJ, Waldman JB. "Lumbar Spine Fusion, Part I: Lumbar Disc Excision for Radiculopathy," In Operative Spinal Surgery. Welch WC, Jacobs GB, Jackson RP (eds). Stamford: Appleton & Lange, 1999, Chapter 13, 182-187.
12. **Welch WC**, Schiff D, Gerszten PC. "Spinal Cord Tumors." In UpToDate, Inc. Rose BD (ed). Wellesley, Massachusetts: www.UpToDate.com, 1999, 2003, 2005, 2007, on line.
13. Johnson JP, Ahn SS, Moossy JJ, **Welch WC**. "Surgery of the Sympathetic Nervous System." In Spine Surgery. Benzel EC (ed). New York: Churchill Livingstone, 1999, Chapter 70, 933-946.
14. **Welch WC**, Kornblith PL. "Carmustine." In Experimental and Clinical Neurotoxicology. Spencer PS, Schaumburg HS (eds). New York: Oxford University Press, Inc, 2000, Part 2, 334-338.
15. **Welch WC**. "Tumors of the Cauda Equina." In Seminars in Spine Surgery. Wiesel SW, Boden SD (eds). Philadelphia: Saunders, 2000, Volume 12, 117-127.
16. **Welch WC**, Gerszten PC, McGrath P. "Intradiscal Electrothermy: Indications, Techniques and Clinical Results." In Clinical Neurosurgery, Volume 48. Howard MA (ed). Philadelphia: Lippincott Williams and Wilkins, 2001, Chapter 16, 219-225.
19. **Welch WC**, Donaldson WF, Marion DW. "Injuries of the Spinal Cord and Spinal Column." In Peitzman AB, Rhodes M, Schwab CW, Yealy DM, Fabian TC (eds). The Trauma Manual 2nd Edition, Philadelphia: Lippincott Williams and Wilkins, 2002, Chapter 20, 140-157.

20. Gerszten PC, **Welch WC**. "CyberKnife Radiosurgery for the Spine." In Techniques in Neurosurgery-Radiosurgery. Lunsford LD, Niranjan A (eds). Philadelphia: Williams and Wilkins, 2003, 232-241.
21. **Welch WC**, Nestler A, Gerszten PC. "Cervical, Thoracic and Lumbar Pseudarthrosis: Diagnosis and Management." In Vaccaro AR, Benzel EC, Anderson DG, Crawford A, Regan J (eds). Complications of Pediatric and Adult Spinal Surgery, New York: Marcel Dekker, 2003, Chapter 8, 87-109.
22. Khairi S, Johnson JP, **Welch WC**. "Surgery of the Sympathetic Nervous System." In Benzel EC (ed). Spine Surgery. New York: Churchill Livingstone, 2004, 2nd edition, Chapter 101, 1357-1366.
23. Gerszten PC, **Welch WC**. "CyberKnife Radiosurgery for Metastatic Spine Tumors." In Neurosurgery Clinics of North America: Management of Metastatic Spine Tumors. Schmidt MH, Fourney DR, Gokaslan ZL (eds.) Philadelphia: Elsevier, 2004, Volume 15, 491-502.
24. **Welch WC**, Gerszten PC, Nestler AP, Burke JP. "Pseudarthrosis of the Cervical Spine." In The Cervical Spine, Cervical Spine Research Society, Clark CR (chief editor). Philadelphia: JB Lippincott Co., 2005, 4th edition, Chapter 88, 1205-1211.
25. Gerszten PC, **Welch WC**. "Outcome Measures for Vertebroplasty and Kyphoplasty." In Vertebroplasty and Kyphoplasty. Resnick DK, Garfin SR (eds). New York: Thieme, 2005, Chapter 4, 24-30.
26. Resnick DK, Alexander JT, **Welch WC**, (Flannagan P, Willis SL). "Resorbable Technology for Spinal Stabilization." In Haid R, Subach BS (eds), Advances in Spinal Stabilization. Rolling Meadows: AANS Press, 2003, Volume 16, pp39-54.
27. **Welch WC**, Maxwell JH, Griffith SL. Refuse to Fuse: The Evolution of Spinal Stabilization Technology." In Maxwell JH, Griffith SL, **Welch WC**, (eds). Non-Fusion Techniques for the Spine: Motion Preservation and Balance, St. Louis: Quality Medical Publishing, 2006, Chapter 1, 3-8.
28. McAfee P, **Welch WC**, Cunningham BW, Dmitriev AE, Hu N, Cappuccino A, Pimenta L. The Cervical Disc: Theory, Biomechanics and Animal Studies." In Maxwell JH, Griffith SL, **Welch WC**, (eds). Non-Fusion Techniques for the Spine: Motion Preservation and Balance, St. Louis: Quality Medical Publishing, 2006, Chapter 5, 69-86.
29. **Welch WC**, Gerszten PC, Griffith SL. "Motion-Preserving Posterior Lumbar Spinal Instrumentation System." In Maxwell JH, Griffith SL, **Welch WC**, (eds). Non-Fusion Techniques for the Spine: Motion Preservation and Balance, St. Louis: Quality Medical Publishers, 2006, Chapter 17, 313-334.
30. Gerszten PC, Burton SA, Ozhasoglu C, Vogel WJ, Quinn AE, **Welch WC**. "Radiosurgery for the Management of Spinal Metastases." In Kondziolka D (ed). Radiosurgery, Basel: Karger, 2006, 199-210.
31. Gerszten PC, **Welch WC**. "Spine: Minimally Invasive Techniques." In Pollock BE (ed). Guiding Neurosurgery by Evidence, Progress in Neurological Surgery, Volume 19 Switzerland: Karger, Basel, 2006, pp 1-17.
32. **Welch WC**. "Neck Pain Disability Questionnaire." In Gatchel RJ (ed), Compendium of Outcome Instruments for Assessment and Research of Spinal Disorders, La Grange, NASS publications, 2006, Section VI, p 57.
33. Jankowitz B, Gerszten PC, **Welch WC**. "Posterior Instrumentation of the Lumbar Spine with the BAK-L Posterior System." In Surgical Techniques in Spinal Instrumentation, Kim D, Vaccaro AR, Fessler R (eds). New York: Thieme Medical Publishers, 2007, Chapter 136, in press.
34. Carrau RL, Snyderman CH, Weissman J, **Welch WC**. "Applications of Intraoperative Navigation for Maxillofacial, Skull Base and Cervical Spine Surgery." In Head and Neck Interventional Radiology. Fried MP, Jolesz FA (eds). Boston: Isis Medical Media, 2007, in press.

35. Jankowitz, B, **Welch WC**, Donaldson WF. "Injuries of the Spinal Cord and Spinal Column." In Peitzman AB, Rhodes M, Schwab CW, Yealy DM, Fabian TC (eds). The Trauma Manual 3rd Edition, Philadelphia: Lippincott Williams and Wilkins, 2007, in press.
36. Gerszten PC, **Welch WC**. "Intradiscal Electrothermal Annuloplasty." In Interventional Spine: An Algorithmic Approach. Slipman D, Simeone F, Derby R (eds). Philadelphia: Elsevier, 2007, Chapter 96, 1055-1062.
37. **Welch WC**, Gerszten PC, Spiro RM. "Posterior Lumbar Motion Preserving Devices." In Decision Making in Spinal Care, Vaccaro AR, Anderson DG (eds). Thieme Medical Publishers, 2007, in press.
38. **Welch WC**, Gerszten PC, Spiro RM. "Luque-Rod Segmental Spinal Instrumentation." In Wolf C, Resnick DK (eds). Neurosurgical Operative Atlas, 2nd Ed., New York: Thieme, 2007, Chapter 33, pp207-211, in press.
39. **Welch WC**, Gerszten PC, and Cheng BC. "Dynesys Spinal Instrumentation System." In Lewandowski K-U, Park P, McLain RF, Kalfas IH, Yaszemski MJ, Trantolo DJ (eds). Innovations in Spinal Reconstruction: Clinical Examples of Applied Basic Science, Biomechanics and Engineering, New York: Taylor and Francis, Section 2, 2007, in press.
40. Cheng BC, **Welch WC**. "Issues of Spinal Instability and Stabilization." In Gerszten PC and Ryu S (eds). Spinal Radiosurgery, New York: Thieme Medical Publishers, 2007, Chapter 28, in press.
41. Cheng BC, **Welch WC**. "Biomechanics of Motion Preservation Devices: Novel Testing Techniques, Standards, and Implications for Future Devices." In Yue JJ, Bertagnoli R, McAfee P, An H (eds). Motion Preservation Surgery of the Spine: Advanced Techniques and Controversies, Chapter 5, in press.

Editorials, Reviews, Chapters, including participation in committee reports (print or other media):

1. **Welch WC**, Karausky P. Academic Research in the HIPAA Era. Opinion piece for the [http://path.up\[mc.edu/cases/case342.html](http://path.up[mc.edu/cases/case342.html), AANS/CNS Joint Section on Neurotrauma and Critical Care, Neurotrauma and Critical Care News Fall, 2003.
2. **Welch WC**, Karausky P. Academic Research in the HIPAA Era. Opinion piece reprinted for the [http://path.up\[mc.edu/cases/case342.html](http://path.up[mc.edu/cases/case342.html), CNS Neurosurgery News 5, 4, 6, 2004.
3. **Welch WC**. Invited commentary regarding a patient with an odontoid fracture and atrophy of the tongue. By Kuitwaard and Vandertop, Surgical Neurology 64:525-532;2005.
4. **Welch WC**. Invited commentary regarding anterior lumbar plate following fusion. By Aryan et al, Surgical Neurology 65:3-7; 2006.
5. **Welch WC**. Invited commentary regarding EMG evaluation of bladder function. By Ammerman et al, Surgical Neurology 65:1-3; 2006.

Books:

1. **Welch WC**, Jacobs GB, Jackson RP, (eds). Operative Spine Surgery. Stamford: Appleton & Lange, 1999 (ISBN 0-8385-7393-2). Reviewed in *J Neurosurg* 2000;92:366-367, and *JBJS* 2000;81-A:1793-4. Invited to archive in the "Signature Collection" of the North American Spine Society, April 2001.
2. Maxwell JH, Griffith SL, **Welch WC**, (eds.). Non-Fusion Techniques for the Spine: Motion Preservation and Balance. St. Louis: Quality Medical Publishing, 2006, (ISBN 1-57626-179-4).

Alternative Media: (List any other non-peer reviewed contributions to alternative communication formats, such as instructional audio or video tapes, articles in the lay press, educational material via Internet, etc.)

1. **Welch, WC.** Featured in *Pittsburgh Post Gazette*, Science and Health section, V69, No 217, March 4, 1996.
2. **Welch, WC.** Quoted by *University Times*, Research Notes section regarding spinal metal cage implants, V31, No 20, June 10, 1999.
3. **Welch, WC.** Featured in *UPMC Health News, WQED Broadcasting*, July 15 and 16, 1999.
4. **Welch, WC.** Featured in *UPMC Health News, WQED Broadcasting*, September 18 and 19, 1999.
5. **Welch, WC.** Featured in *Pittsburgh Tribune-Review*, Local Section, V 111, Number 299, December 6, 1999.
6. **Welch, WC.** Featured in *Allegheny Times*, State/Local Section, Friday, January 14, 2000.
7. **Welch, WC.** Interviewed for *700 Club/Fox Family Cable*, National Edition, May 1, 2000.
8. **Welch, WC.** Interviewed for *WTAE TV Channel 4 News*, Medical Section, by Marilyn Brooks, May 2, 2001.
9. **Welch, WC.** Interviewed for *Orthopedics Today*, by Susan Rapp, May 12, 2002.
10. **Welch, WC.** Assisted and appeared in the video production of "Safe-Path" surgical tool for the Mekanica Corporation July 19, 2002.
11. **Welch, WC.** Featured for UPMC Blood Drive Campaign.
12. **Welch, WC.** Featured in *Physician's News Digest* Vol. VIII, No. 2, UPMC Update, "Intraoperative Monitoring Improves Spinal Safety," September, 2002.
13. **Welch, WC.** Featured in *LongLifeClub.com*, May 2004, lower back pain.
14. **Welch, WC.** Quoted in *Pittsburgh Magazine*, July 2004, on lower back pain.
15. **Welch WC, Delitto, AD.** Contributed to the development of an interactive Acute Low Back Pain algorithm for Emmi Solutions Inc., December 2006.
16. **Welch WC.** Featured in *Clinical Briefing*, November 2007, Non-Fusion Stabilization of the Spine in Degenerative Lumbar Compression and Stenosis.
17. **Welch WC.** Featured in *Physician's News Digest*, November 2007, Non-Fusion Stabilization of the Spine in Degenerative Lumbar Compression and Stenosis.
18. **Welch WC.** Featured on WPHD 1210 AM radio, December 2, 2007, Lumbar Spinal Stenosis.

Patents:

1. **Welch WC, Kornblith PC:** Contributions to the *American Type Culture Collection*, "Human-derived Glioblastoma Multiforme Cultured Cells, SNB-19," 1995.
2. **Schmiel D, Houfburg R, McPhillips D, Welch WC.** Posterior Oblique Lumbar Arthrodesis U.S. Patent Application No. 09/630,793 filed 02 August 2000 and 11/364,413 filed 27 August 2006.

Revised 9/97